Factors influencing the decision to adopt an Information Technology Risk Management framework at universities in South Africa

University of Cape Town

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BY

TINA SEALE
CHRTIN004

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LIST OF ABBREVIATIONS

ASAUDIT	Association of South African University Directors of Information Technology
CHE	Council for Higher Education
CIO	Chief Information Officer
CRO	Chief Risk Officer
DOI	Diffusion of Innovation
ERM	Enterprise Risk Management
HEA	Higher Education Act
HEQF	Higher Education Qualifications Framework
HEI	Higher Education Intuitions
HOD	Head of Department
IS	Information Systems
IT	Information Technology
ICT	Information and Communication Technology
ITRM	Information Technology Risk Management
SME	Small and Medium sized Enterprises
SRC	Student's Representative Council

Declaration

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I. Abstract

The purpose of this research is to identify the main factors influencing universities in South Africa to adopt specific Information Technology Risk Management (ITRM) frameworks. The research has been conducted to understand why universities adopt different ITRM frameworks. The sample group of universities used in this research comprise four public universities in the Western Cape, South Africa.

To gain further insights into the decision-making process, an interpretivist philosophy, using a deductive approach, has been used. Roger's Diffusion of Innovation theory is used as a lens to understand the decision-making process to adopt an ITRM framework at universities. A combination of questionnaires, interviews and secondary data has been used to collect data from the sample of universities.

The findings establish that inconsistent ITRM frameworks have been adopted at the participating universities. Numerous factors, both internal and external to the university, influence the decision-making process. Internal factors which have had a strong influence on the adoption of an ITRM encompass the attitude of *decision makers, strong corporate governance and strong leadership in top management and within the IT department*. External factors with the strongest influence on the decision-making process are contained within the legislative *and statutory* requirements mandated by the Higher Education Act 101 of 1997. Additional external factors influencing choice are certain *regulatory requirements* as well as the perceived *popularity of certain frameworks*. The recommendation of *external parties* is often closely considered when determining framework fit and adaptability to a university's environment.

The sample group of universities has been limited to four public universities within the Western Cape. As a consequence, the data collected is limited due to minimal participation across all participating universities. Further research, such as case studies, is recommended in order to gain additional in-depth knowledge of the decision-making process regarding the implementation of ITRM frameworks at universities.

II. Acknowledgement

I would like to express my profound gratitude to the following individuals for their guidance and support over this past two years of my research journey:

- My family, for their understanding and support.
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- The research participants who have provided me with the valuable information required for this research

CHAPTER 1: INTRODUCTION

1.1 Introduction

The recent national student protests at public universities in South Africa presented an increase in risks to universities. The apparent risks which had to be managed were the potential and often actual damage to property, reputational damage, completion of the academic year and the effects on graduating students and research output, to name but a few (MacGregor, 2016). In their attempt to manage these risks. Unfortunately, universities were not always successful in controlling many of the risks, despite having risk management frameworks in place.

Another risk, often overlooked or unforeseen and equally damaging, applies to a university's Information and Communication Technology (ICT) infrastructure. The repercussions resulting from irreparable damage to ICT infrastructure due to vandalism or arson, as was the case with buildings at some universities in 2016, might have been catastrophic; for example, the loss of documented university research and intellectual property would severely affect the organisation. In order to mitigate risk, it is therefore imperative that Information Technology (IT) is managed in a controlled manner, both proactively and reactively. Each university should ensure they understand their IT risks and manage them accordingly.

A definition of risks

Risks are defined as an incident, event or issue that transpires, which can negatively affect an organisation's core objectives (Ackley et al., 2007; Faber & Faber, 2010; Mattie, Morley, Cassidy, Goldstein, & Johnson, 2000). Incidents, events or issues occur regularly in all areas of the organisation as well as our personal lives (Faber & Faber, 2010; Shoki, Zakuan, Tajudin, & Ahmad, 2014). In order to control the impact of these risks, organisations or individuals need to have measures in place to mitigate the risks (Babb, Anton, & Bleicher, 2013). To control and manage the risks, there needs to be a common classification of what a risk is before they can decide on how to manage the risks (Ackley et al., 2007; Mattie et al., 2000). Despite the negative effect of risks to an organisation, some risks can highlight new business ventures or improve the existing business processes (Babb et al., 2013).

Managing risks

All risks across the organisation should be identified and managed effectively to ensure the organisation does not suffer potential financial loss or reputational

damage (Babb et al., 2013; von Roessing, 2010; Saleh & Alfantookh, 2011). Risks are measured by the probability of an event occurring and the impact it has on the organisation (Babb et al., 2013; Liu & Wang, 2014; von Roessing, 2010). To manage risks more effectively across the organisation, an Enterprise Risk Management (ERM) framework should be implemented to ensure all risks are controlled with minimal impact to the organisation (Babb et al., 2013; Gerber & von Solms, 2005; ISACA, 2009; Lundquist, 2011; Mattie et al., 2000). The key objectives for adopting an ERM framework are to improve decision-making, the overall business strategy, statutory compliance and preventing financial losses for any type of organisation (Pirani, 2013; Shoki et al., 2014). Fadun (2009) in his research highlighted similar benefits in addition to increased stock prices, enhanced capital allocation, improved operations, profitability and effective business processes. Although not all of these benefits, such as stock prices and profitability, are applicable to all organisations, most of these benefits are of importance to an organisation. Bhattacharjya & Chang (2006) highlighted the importance of implementing IT governance is to improve business performance and adhere to regulatory requirements. Risk management is also mandatory for statutory and regulatory requirements (Bichsel & Feehan, 2014; Christopher & Sarens, 2015; Republic of South Africa, 1997) and is therefore an influencing factor for adopting a risk management framework.

Information Technology Risk Management

Information Technology (IT) governance oversees the alignment of IT strategies with the business' strategy and therefore Information Technology Risk Management (ITRM) is strongly encouraged to be a part of the ERM strategy (Babb et al., 2013; Faber & Faber, 2010; ISACA, 2009; Wessels & Van Loggerenberg, 2006). Wessels and van Loggerenberg (2006, p.3) defined IT governance as a "*framework of IT related processes, disciplined to deliver maximum IT value in order to complement business strategy, while balancing risks*". All IT related risks across the organisation need to be incorporated into ITRM (Ahlan, 2012; Babb et al., 2013; Faber & Faber, 2010; ISACA, 2009; Wessels & Van Loggerenberg, 2006) and managed accordingly.

IT Risk Management in higher education

In earlier studies it has been emphasised that ITRM must be implemented within higher education institutions and also form part of the overall enterprise strategy (Bichsel & Feehan, 2014; Botha, 2012; Helsloot & Jong, 2006; Johl, von Solms, &

Flowerday, 2014; Mattie et al., 2000; Wessels & Van Loggerenberg, 2006). The higher education industry has slowly started to adopt industry best practice ITRM frameworks (Ackley et al., 2007; Bichsel & Feehan, 2014; Raanan, 2009; Waters, 2008). In a study conducted by Educause, universities across America and Europe who have adopted some of the most common and leading frameworks in IT governance, such as COBIT, NIST and ITIL, were identified (Bichsel & Feehan, 2014). These frameworks address a vast array of disciplines concerning IT governance including various components of IT risk management (Bichsel & Feehan, 2014). Other universities have managed to cobble together a framework best suited to their own needs and based on components from various existing frameworks (Bichsel & Feehan, 2014; Pirani, 2013; Waters, 2008). Statutory requirements in South African dictate that higher education institutions implement controls to effectively minimise the impact of risk to the university (Republic of South Africa, 1997). The act provides guidelines from the King III report on IT governance and in particular risk management (Institute of Directors of South Africa, 2009; PricewaterhouseCoopers, 2009).

Aim of research

This research undertaking focuses on Information Technology Risk Management (ITRM) at universities in South Africa. The literature review examines numerous research papers on the topic of ITRM and ERM at various types of organisations. The research aims to explore the factors influencing the adoption of a specific ITRM framework at universities by using Rogers' Diffusion of Innovation (DOI) theory (2003) as a lens to understand the decision-making process. Roger's DOI theory is discussed in more detail in Section 2.5 relative to the decision-making process for the adoption of an ITRM framework.

This research focus was chosen to explain the inconsistent ITRM framework adoption at universities (Ajami & Al-Qirim, 2013a; Bichsel & Feehan, 2014; Pirani, 2013; Waters, 2008). The literature review highlights the correlation between an apparent lack of a single, acceptable IT risk management framework in the higher education industry and the prevailing plethora of frameworks currently in use (Ackley et al., 2007; Bichsel & Feehan, 2014; Raanan, 2009; Waters, 2008). By identifying the factors influencing a particular university's decision-making process, the researcher seeks to understand why certain frameworks were chosen over and above others. Considering the paucity of existing academic literature describing or explaining the adoption of ITRM at specifically universities, a clearer understanding

is necessary (Beasley, Clune, & Hermanson, 2005; Botha, 2012; Pirani, 2013).

The literature review refers to factors influencing ERM adoption (Amalina, Abdullah, Zakuan, Khayon, & Ariff, 2012; Fadun, 2009; Paape & Speklè, 2012; Zhao, Hwang, & Low, 2013) and ITRM adoption (Ajami & Al-Qirim, 2013a; Bhattacharjya & Chang, 2006; Bichsel & Feehan, 2014; Viljoen, 2005) in an organisation. As such, these organisational factors will be used to compare and support those factors influencing ITRM adoption at universities. Most prior research related to ERM and ITRM adoption excludes the higher education environment, hence the intention to contrast prior research with universities in South Africa.

1.2 Problem Statement

Although universities are not structured as corporate organisations, they are still required to manage IT risks in a similar manner (Bichsel & Feehan, 2014). Research reveals that universities adopt different ITRM frameworks and there is no consistency amongst universities on how to manage their IT related risks (Bichsel & Feehan, 2014; Botha, 2012; Helsloot & Jong, 2006; Johl et al., 2014; Pirani, 2013; Raanan, 2009; Shoki et al., 2014; Viljoen, 2005). Viljoen (2005) advocates that a common framework for all universities will increase consistency and promote a quality methodology for dealing with IT risks. In order to understand why there is a lack of consistency, the researcher seeks to understand the decision-making process universities undertake when choosing a particular ITRM framework.

1.3 Research Objectives

The key objective is to determine the main factors that have an influence on the decision to adopt a specific ITRM framework at universities in South Africa. In addition, a conceptual framework will be developed describing the decision-making process and the main factors influencing the process to adopt an ITRM framework.

1.4 Research Questions

Based on the problem statement, the research questions focus on the factors influencing the decision to select a specific ITRM framework at a university in South Africa. The research questions divide into primary and secondary questions:

Primary Research Question

- What are the factors influencing the decision to adopt an Information Technology Risk Management framework within universities in South Africa?

Secondary Research Questions

- Who are the relevant individual decision makers for ITRM framework adoption at a university?
- What is the university's process to select an ITRM framework?
- What are the internal factors which influence the individual's decision to adopt a specific ITRM framework or not at the university?
- What are the external factors which influence the individual's decision to adopt a specific ITRM framework or not at the university?
- What are the perceived benefits for the university when selecting a specific ITRM framework?
- What are the perceived challenges the university can anticipate when selecting a specific ITRM framework?

1.5 Research Contribution to Theory and Gaps in Literature

While there is much research on IT risk management in various industries, it has been stated that there is not much research in IT risk management in higher education, such as universities (Ajami & Al-Qirim, 2013b; Bichsel & Feehan, 2014; Raanan, 2009; Waters, 2008). There are universities located around the globe, that have adopted various frameworks to manage IT risks (Ajayi & Hussin, 2014; Bichsel & Feehan, 2014). There is also a lack of research that specifically investigates the factors influencing the decision to adopt an IT risk management framework within a university or any other higher educational institution (Beasley et al., 2005; Jo, Lee, & Kim, 2010; Kanhai & Ganesh, 2014; Nugroho, 2014; Paape & Speklè, 2012; Viljoen, 2005; Zhao et al., 2013). There is an abundance of literature on ITRM framework adoption that focuses on the perceived benefits of adopting specific frameworks (Govender & Pretorius, 2015; Jo et al., 2010; Paape & Speklè, 2012; Zhang & Zhou, 2014).

There is also prior research focusing on the adoption of Information Systems process innovations (Lyytinen & Damsgaard, 2001; Mustonen-Ollila & Lyytinen, 2003) and IT adoption in higher education (Govender, 2013; Govender & Pretorius, 2015) using Roger's DOI theory. In addition, the researcher has found a similar study on factors associated with the implementation of enterprise risk management in organisations however it didn't include universities or other higher education institutions in the research nor did it specifically include using the DOI theory (Beasley et al., 2005; Zhao et al., 2013).
The researcher would therefore like to contribute to this area of knowledge by applying Roger's Diffusion of Innovation theory (2003) and reveal the factors which

influence the adoption of an IT risk management framework within universities in South Africa.

1.6 Dissertation Outline

A high-level overview of this dissertation describes the content of each chapter.

Chapter 1: Introduction

Introduction
In which the context of this research is presented.

Problem Statement
The researcher highlights the anomalies of ITRM adoption at universities.

Research Questions and Objectives
The research objectives are to address the problem statement by exploring the research questions.

Research Contribution to theory and Gaps in literature
In which the gaps in literature in the field of ITRM in universities are identified and addressed.

Chapter 2: Literature Review

Literature Review
In which the Enterprise Risk Management and Information Technology Risk Management is discussed in the context of a university. The literature review also identifies factors influencing ITRM and ERM adoption in earlier research.

Chapter 3: Methodology
Research Methodology
This section is dedicated to the research framework and discusses how the research will be conducted.

Chapter 4: Data Analysis
The data collected from the research instruments are analysed in relation to the research questions.

Chapter 5: Findings
In this chapter, concluding observations are made based on the data analysis.

Chapter 6: Conclusion
The final research conclusions

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CHAPTER 2: LITERATURE REVIEW

2.1 Literature Review Outline

The literature review chapter starts by reviewing the background of higher education in South Africa and the governance structures. The legislature governing higher education is mentioned to provide context to the research.

Furthermore, Enterprise Risk Management and its relevance to Information Technology Risk Management is introduced in general and related to a higher education institution.

The literature then delves into factors influencing the adoption of ERM and ITRM frameworks. Roger's Diffusion of Innovation (2003) theory is discussed and rationalised for use in this research, to understand the factors.

2.2 Higher Education in South Africa

2.2.1 Background

Higher education in South Africa is well defined and regulated by the Higher Education Act (HEA) 101 of 1997. The HEA defines a higher education institution as any university that provides higher education and is an established public or private university declared by the act. The act also defines the establishment, composition and function of the Council for Higher Education (CHE) that acts as the quality control board of higher education in South Africa. The CHE therefore advises the Minister of the Department of Education and Training on any matters relating to higher education. Higher education in South Africa entails learning a particular program that leads to a formal qualification as defined by the Higher Education Qualifications Framework (HEQF). Higher education in South Africa should provide good quality education, which in turn will have a positive impact on the development of our country (PricewaterhouseCoopers, 2009).

Universities do not operate in the same manner as a corporate company. A university's key function is teaching and learning and will therefore have a different governance structure than its corporate counterpart, as mandated by the HEA. The corporate company's key function is to make a profit and prosper financially whereas the university does not operate as a profit-making organisation. The university's main income stream stems from government subsidies, student fees and private donations for research. Universities also have more complex and unique governance structure as they are responsible for different management aspects defined by the act (Republic

of South Africa, 1997).

2.2.2 Governance structure of a university

Chapter 4 of the HEA refers to the governance structure of public higher education institutions. Each public university should appoint a chancellor and establish the governance structure as depicted in Figure 1.

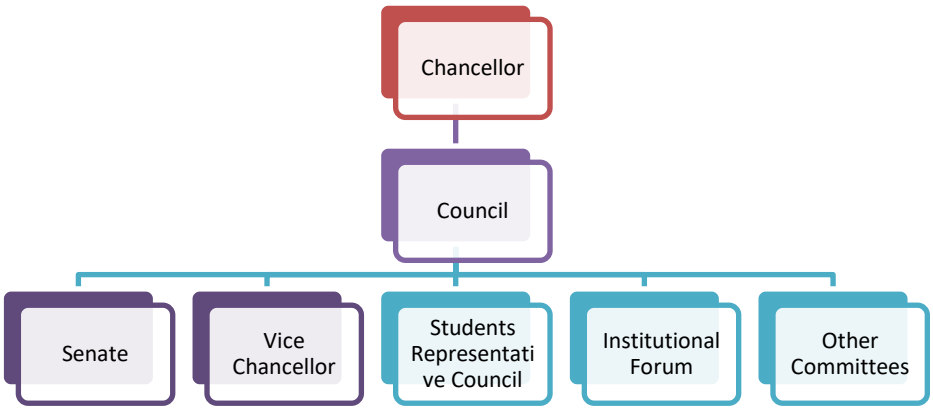


Figure 1:Governance of Public Higher Education Institutions (Republic of South Africa, 1997)

From this point onwards, a public higher education institution is referred to as a university, particularly because the study focuses on public universities in South Africa. Although universities are public and owned by the South African government, universities are autonomous in nature. Universities therefore are required to manage themselves effectively and fulfil the requirements of the act. The governance structures of universities have been defined by the HEA to uphold the autonomous state but still requires that each university reports back on all matters to the Minister of the Department of Education and Training and other stakeholders (PricewaterhouseCoopers, 2009). This reporting requirement is noted in the HEA where all financial and non-financial matters are reported on.

The chancellor is the ceremonial head of the university and does not form part of the governance of the university. Council is mandated by the HEA to manage the university and is responsible for setting the goals and mission of the university. Senate is responsible for all academic and research matters and reports directly to council. Both senate and council establishes different committees for their respective portfolios who in turn report back to either senate or council. Audit and risk committees are two examples of committees which are setup at the university and report back to senate and council. The vice chancellor acts as the university's principal and is responsible for the day to day management and administration of the university. The vice chancellor will have several deputy vice chancellors reporting to him/her, each one of

whom administers various departments and faculties across the university. The hierarchical structure for the various deputy vice chancellors are depicted in Figure 2. The respective heads of department (HODs) have their own management team, highlighted in the following diagram.

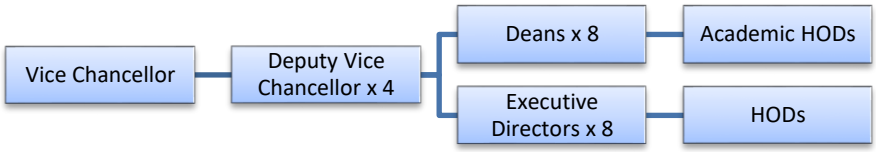


Figure 2: Governance Hierarchy

The institutional forum of a university advises council on any matters relating to the act such as race and gender equity issues. The students' representative council (SRC), as mandated by the HEA, represents students and their needs. Annually, students elect the governing body of the SRC. The contents of the act are quite specific and provides information to all the stakeholders in a university by informing them of their mandated deliverables.

In addition to the senior management group of the university, various committees exist to oversee certain areas of the university such as Information Technology (IT), Human Resources, Finances and Student Affairs and Risk and Audit. To emphasise the complexity of organisational governance, there could be and often are, several committees in the IT area responsible for decision-making on some IT aspect or another. One committee will be accountable for strategy, another for project management and another for operational management. It can become quite complex if the roles and responsibilities are not clearly set out in the terms of reference for these committees. Because there may be IT matters which are dealt with in more than one committee, it is imperative that each committee knows its responsibilities.

A good governance structure, however complex it might be, should set the tone for the rest of the university on how risks are managed across the university (Bichsel & Feehan, 2014; Mattie et al., 2000).

2.2.3 Legislative

The HEA requires council and senior management of the university to comply with the King III report on corporate governance (Department of Higher Education and Training, 2012). The King III report was released in South Africa in 2002 with its focus

on corporate governance. The updated King III report was released later in 2009 and included the governance of higher education institutions (HEI) (PricewaterhouseCoopers, 2009; Republic of South Africa, 1997). Where certain aspects of King III are not applied at the university, management are expected to explain why they have not been adopted by the university's stakeholders (PricewaterhouseCoopers, 2009; Republic of South Africa, 1997). King III is an adaptable corporate governance framework and the university needs to apply the suitable components to its environment. This governance framework contains best practice recommendations and principles on governance. More specifically for this literature review, King III recommends that a risk committee is formed in a university and all identified risks are managed effectively whilst maintaining the university's financial and reputational credibility.

Chapter 4 of the King III report refers to IT governance practices and stipulates that council is responsible for IT governance and management should be responsible for the implementation of the governance practices (Institute of Directors of South Africa, 2009; PricewaterhouseCoopers, 2009). The governance includes the management of IT assets, risks and finances. It also specifies that IT strategy should be aligned with business strategy (PricewaterhouseCoopers, 2009). The King III report declares *"IT is an integral part of the public higher education institution's risk management"* (Department of Higher Education and Training, 2012; Institute of Directors of South Africa, 2009).Universities are therefore legally required to have the proper governance structures in place to manage all risks, including IT risks. Therefore, one can state that ITRM within a university is an important factor of risk management across the university as it could present significant risks affecting the university's reputation. ITRM should therefore be managed effectively to support the university's strategy (PricewaterhouseCoopers, 2009).

2.3 Enterprise Risk Management and IT Risk Management at a university

Enterprise Risk Management (ERM) at a university can be defined as the management of risks across the organisation. These include risks related to leadership, financial, information technology, student affairs, human resources, academic, research, teaching, ethical, reputational and legal (Bichsel & Feehan, 2014; Pirani, 2013; Raanan, 2009; Toma, Alexa, & Şarpe, 2014). ERM can be implemented once a framework has been established and adopted by the university (Ackley et al., 2007). The audit committee at the university is responsible for setting the tone for the risk culture at the university (Mattie et al., 2000).

The usage of IT has been found to be one of the key success factors to enable the university to address the demands of the students in a prompt manner (Helsloot & Jong, 2006; PricewaterhouseCoopers, 2009). As the use of technology has grown in higher education, students are able to adapt to electronic learning, however at the same time, systems become more susceptible to threats (Helsloot & Jong, 2006). It is also noted that in addition to being an enabler, IT is an important asset for the university's strategy (Pirani, 2013; PricewaterhouseCoopers, 2009). ITRM focuses on the identification and management of risks within the IT domain and mitigates the risks (Bichsel & Feehan, 2014; Pirani, 2013). ITRM should be part of the ERM strategy and aligned with the goals of the institution (Benaroch & Lichtenstein, 2006; Bichsel & Feehan, 2014; Feehan, 2013; Pirani, 2013; PricewaterhouseCoopers, 2009). Pirani (2013) does however mention that where ITRM is not part of the ERM, there should be areas where the ITRM overlaps with ERM to address those business risks where IT is involved. IT related risks should be identified, assessed and controls put in place to either remove the risks or reduce the risk occurrence (Waters, 2008). Where there is a misalignment of IT and the university strategy, the reliability of IT will not be effective to the rest of the university. IT cannot work in isolation and has to be aligned with the university's goals (Bichsel & Feehan, 2014). Where ITRM is part of ERM it allows IT senior management to be part of the strategic decision-making process of the university (Pirani, 2013). It also allows IT management to be aware of the university's objectives and align the key IT strategies with the university's (Pirani, 2013).

Researchers have developed frameworks for universities however these have not been adopted as industry standards for universities (Shoki et al., 2014; Waters, 2008). Other universities tend to adapt industry standards which are used in corporate companies (Bichsel & Feehan, 2014). There is a significant requirement to address ITRM at universities in South Africa due to legislative requirements (Republic of South Africa, 1997). Additional research in this field is therefore justified in the South African context.

2.4 Earlier research in risk management adoption studies

This section examines the literature related to the adoption of ERM and ITRM in an organisation or university. The studies were mostly quantitative studies, using questionnaire instruments for the research. These studies highlighted attempts to understand the factors influencing the decision to adopt ERM frameworks. Since ITRM is required to be a part of ERM in the organisation (Benaroch & Lichtenstein, 2006; Bichsel & Feehan, 2014; Feehan, 2013; Pirani, 2013; PricewaterhouseCoopers, 2009), the same logic may be used for ITRM adoption at universities.

2.4.1 Factors influencing ERM adoption

In Nigeria Fadun (2009) conducted a study on the adoption of ERM in companies. The findings highlighted the slow rate of ERM adoption due to the lack of awareness in Nigerian companies (Fadun, 2009). In addition, Fadun (2009) identified key internal and external factors that influence the decision to adopt ERM in his literature review. The internal factors influencing adoption of ERM includes the presence of internal auditors, the support from the board of directors and a strong risk culture. The external factors include the strong partnership with external auditors with the internal auditors as well as the framework's suitability to the organisation (Fadun, 2009). In order to facilitate an informed decision-making process, Fadun (2009) suggests that the many benefits derived from adopting a framework needs to be clearly articulated to senior management. The significant factors which determined the adoption of ERM in Nigerian companies were identified as a strong top management approach to ERM and integration of risk management into the company's strategy (Fadun, 2009).

Kanhai and Ganesh (2014) examined specific factors which could possibly influence the adoption and implementation of ERM in banks within Zimbabwe. The theory construct factors were the adequacy of risk governance structures, quality of organisation culture, and intensity of regulatory environment and size of the bank (Kanhai & Ganesh, 2014). These constructs were selected as they were found to be among the top four for ERM adoption (Kanhai & Ganesh, 2014). However, their findings, consistent with other findings in this research area, revealed that only the intensity of the 'regulatory' environment had an influence on ERM adoption and implementation (Kanhai & Ganesh, 2014). ITRM adoption was not factored into this research however these factors can be considered when doing ITRM adoption studies.

In a similar study conducted on the influences of ERM adoption and its impact on the business' performance, it was found that both internal and external factors contributed to ERM adoption (Amalina et al., 2012). The adoption of risk management should be promoted from within the organisation (Amalina et al., 2012). Amalina et al. (2012) developed a conceptual framework that highlighted the factors influencing the adoption of an ERM framework and its impact on the performance of an organisation. The conceptual model, derived from previous literature studies on ERM adoption, is depicted in Figure 3. The findings reveal that the driving factors contributing to the implementation of ERM are internal factors, external factors and firm and industry characteristics. These all have a positive impact on the company's performance

(Amalina et al., 2012). Internal factors include; the existence of a chief risk officer (CRO) in the company who will drive risk management and; the support from top management for ERM adoption which will filter down to the rest of the organisation. External factors influencing ERM adoption are corporate governance, regulatory compliance and the presence of an external auditor preferably from one of the 'big four' firms. The firm and industry characteristics refers to the managerial perspective, financial compliance and marketing (Amalina et al., 2012).

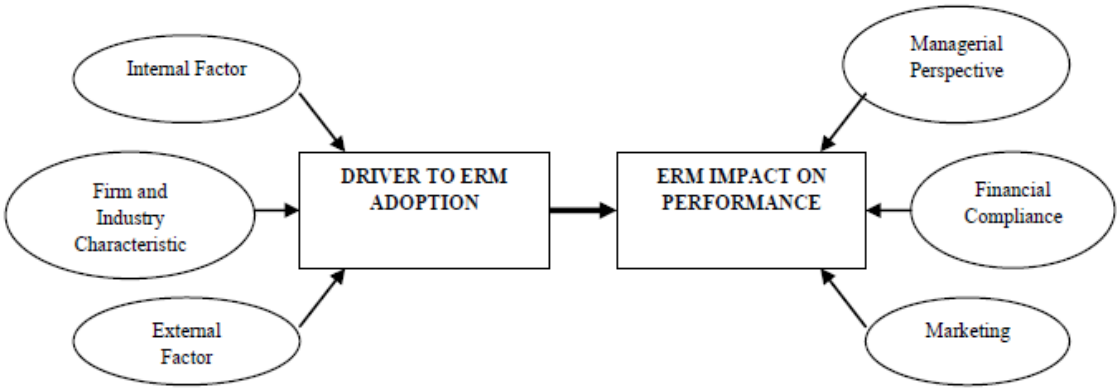


Figure 3: Proposed Conceptual Model (Amalina et al., 2012)

Beasley's (2005) study on factors associated with ERM adoption found that it was positively influenced by the presence of a CRO within the organisation and industry. The CRO at the organisation is responsible for risk management across the organisation and will ensure that ERM is effectively implemented. Where the board is independent from management, the adoption of ERM is likely to adopt ERM because of the board's support (Beasley et al., 2005). The findings also found where top management of the company promotes ERM strategy down to the rest of the company; the awareness and adoption will increase. In addition, where there is an auditing firm from the powerful Big Four, the company is likely to have a strong risk management approach (Beasley et al., 2005). Finally, the larger the size of the organisation, the bigger the risk set the organisation can be exposed to. Therefore, the size of the organisation influences ERM adoption at companies. This can be largely influenced by the type of industry the study is conducted at as certain industries are required by legal and regulatory compliance to have a risk management strategy (Beasley et al., 2005).

Another study (Zhao et al., 2013) conducted on ERM adoption in Chinese construction companies revealed similar findings on the factors influencing ERM adoption. The significant factors influencing adoption included the commitment of the board and top

management, risk identification, risk analysis, risk response, objective setting, ERM ownership, integration of ERM into business processes and sufficient resources (Zhao et al., 2013). Although more factors have been identified in the study, these were the top six identified by the research participants. The existence of a CRO and a controlled process to identify and analyse risks, were important to the participants of the study. Each business process should ensure that it incorporates ERM throughout and identifies all relevant risks. This can take a considerable time review throughout the organisation (Zhao et al., 2013).

Paape and Speklé (2012) examined the ERM selections in small and medium-sized enterprises (SME) and the factors that influenced those selections. This research highlights similar factors in this area which have emerged in previous research. These include regulatory, internal factors, ownership structure and firm and industry characteristics (Paape & Speklè, 2012).

In a more recent study, the researchers attempted to understand the drivers influencing the implementation of risk management practices in an SME (Hudin & Hamid, 2014) using Rogers' DOI theory, Contingency and Institutional theories. A proposed conceptual framework was developed with the aim of testing the existing theories as depicted in Figure 4.

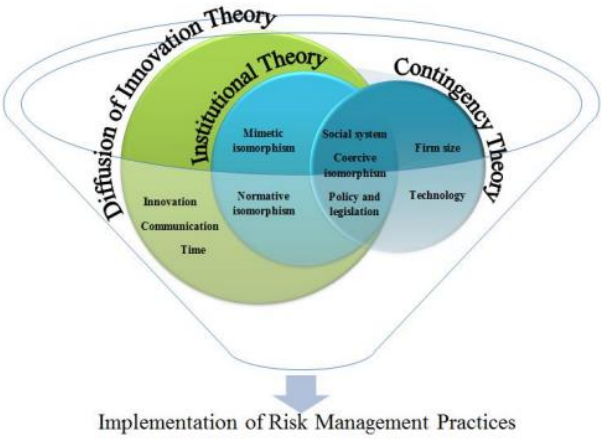


Figure 4: Conceptual Framework (Hudin and Hamid, 2014)

The key drivers influencing risk management practices included corporate governance, compliance, regulations, pressure from external auditors, firm and industry characteristics, presence of a chief risk officer, support from the board, emergence of new business trends, increased occurrence of risk events, and the awareness of company vulnerabilities (Hudin & Hamid, 2014)

The adoption of ERM, which is strongly supported by European institutions to ensure

compliancy for all financial, legal and regulatory standards, is also recommended for universities (Lundquist, 2011). The reasons why institutions decide to adopt an ERM is a research question Lundquist believes to be of relevance, in the context of empirical ERM research, where ERM is adopted at universities. Although in the case of this study ITRM adoption is being researched, its findings could develop and augment the empirical research as recommended by Lundquist (2011).

2.4.2 Factors influencing ITRM adoption or other IT adoption

This section will reflect on earlier research on factors influencing ITRM framework adoption. There are existing studies focusing on the implementation and perceived benefits of specific frameworks such as ITIL (Bhattacharjya & Chang, 2006; Lubambo, 2009) and COBIT (Jo et al., 2010; Khther & Othman, 2013; Steenkamp, 2009; Zhang & Zhou, 2014). These two frameworks have been highlighted by various studies as being the most prevalent ones used in higher education (Ajami & Al-Qirim, 2013a, 2013b; Bhattacharjya & Chang, 2006; Bichsel & Feehan, 2014; Crowster, 2009). These studies do not have a strong emphasis on the factors that influenced the organisation or university to select the framework.

The factors influencing COBIT adoption were examined, using Roger's DOI theory (Jo et al., 2010). This research examines any selected ITRM framework with Rogers' theory. The perceived characteristics of this theory were used to identify the key factors in the organisation. This quantitative study identified the key factors in the research model. These factors were grouped into internal (understanding, changed, perceived benefits) and external (external certification, external support) factors (Jo et al., 2010).

Viljoen's (2005) research advocates for the implementation of a common IT governance framework in higher education in South Africa. This study focused on finding a suitable IT governance framework for higher education. His stance supported a common framework that would ensure quality assurance in higher education(Viljoen, 2005) IT governance. Guidelines were developed for selecting an IT governance framework in higher education (Viljoen, 2005). The guidelines or characteristics were based on the basic principles of good corporate governance as defined by the King III report .These criteria were then contrasted to common IT governance frameworks such as COBIT, ITIL and BSI500 (Viljoen, 2005) as indicated in the Table 1 below.

CRITERIA	COBIT	ITIL	BS15000
The approach is more process oriented than prescriptive in nature	COBIT is strongly process oriented.	Process oriented but includes more detailed prescriptions than COBIT. MOF emphasise behaviour through the MOF team model.	Strongly Prescriptive.
Framework incorporates quality principles such as continuous improvement	Strongly quality process oriented.	Strong focus on quality.	Strong focus on quality.
The framework provides guidelines regarding indicators of success and measures of effectiveness.	Management guidelines contain clear key performance indicators, key success factors and key goal indicators.	N/A	N/A
Internationally accepted good practice	International De Facto IT governance standard.	Internationally accepted service management standard.	British standard, likely to become ISO standard for service management. Identical to South African Standards Organisation SANS 15000-2 / :2004
Self-assessment is accepted.	Self-assessment is made by means of the IT governance maturity model, and other metrics.		Clause 4.1.7. of ISO 17799 explicitly says that reviews can be carried out by an existing internal audit function (Certification is done by a third party.
Provides controls so that decisions can be made free from undue influence	Recommends structures and controls from board level down.	More service management than governance oriented.	More service management than governance oriented.
Guidelines regarding ethics	Deals with Ethics specifically	N/A	N/A
Feasible to implement in South African HE environment	Freely available standard and documentation.	Derivates such as the MOF freely available.	Cost of documentation very reasonable.
Demonstrable benefits at HE institutions in the world	Curtin University Australia, since the year 2001	N/A	N/A
Complete.	Most complete as an IT governance framework	Service management standard of great value in IT governance.	N/A
Compatible with other standards and frameworks.	Developed after comprehensive review of world's best practice and professional standards in the area of corporate governance, audit and control, project management, information security, quality management etc. Several mappings from COBIT controls to other	Most IT service management frameworks based on ITIL. Clear overlap and synergies with, for example COBIT.	Requires that BS7799 requirements must be met in the area of security management. Can be used in conjunction with ISO 9000

	standards have been made.		

Table 1: Selected Characteristics of IT Governance Frameworks (Viljoen, 2005)

Based on the literature reviewed, some of the key factors influencing the decision to adopt an ITRM and ERM are highlighted in Table 2. A combination of some of these internal and external factors, as well as the university's context, could influence an individual's decisions where specific ITRM framework selection is concerned. There are also other factors that have not been listed here that could influence a decision. These will be interrogated by the researcher during the data collection stage of this research. These factors are used in the conceptual framework to corroborate findings in the literature.

	Influencing Factors …	ERM Adoption	ITRM Adoption
Internal Factors	Strong Leadership/Support from Board	Fadun (2009) Amalina et al. (2012) Beasley (2005) Zhao, Hwang, & Low (2013) Paape & Speklè (2012) Hudin & Hamid (2014)	Van Niekerk & Maree, (2004)
	Integrated Risk Management strategy aligned with Business Strategy	Fadun (2009) Zhao, Hwang, & Low (2013)	
	Adequacy of Risk Governance Structures / *Presence of Chief risk officer*	Kanhai & Ganesh, 2014 *Amalina et al. (2012)* Hudin & Hamid (2014)	
	Quality of organisation culture	Kanhai & Ganesh, 2014	
	Size of organisation	Kanhai & Ganesh, 2014	Van Niekerk & Maree, (2004)
	Firm and Industry Characteristics	Amalina et al. (2012) Hudin & Hamid (2014)	
	Presence of a Big Four Auditing Firm	Amalina et al. (2012) Beasley (2005) Hudin & Hamid (2014)	
	Strong Corporate Governance	Hudin & Hamid (2014)	
	COBIT adoption factors: Understandability of COBIT, Changes in organisation and duty, external certification had NO effect External Expertise does HAVE an effect		Jo, Lee, & Kim, (2010)
	Attitude of participants		Van Niekerk & Maree, (2004)
External Factors	Financial Compliance	Lundquist (2011) Amalina et al. (2012)	
	Legal/Statutory Compliance	Lundquist (2011) Hudin & Hamid (2014)	
	Regulatory	Lundquist (2011) Kanhai & Ganesh (2014) Amalina et al. (2012) Paape & Speklè (2012)	

Table 2: Summary of Factors influencing ERM and ITRM Adoption

The researcher will review the decision-making process for selecting an ITRM framework at each of the universities. Roger's DOI theory will be dissected to understand which factors led to the decision to adopt the ITRM framework. While this study is not on ERM adoption but on ITRM adoption, the same factors are used as the decision-making process is similar (Jo et al., 2010; Van Niekerk & Maree, 2004; Rogers, 2003). Because stakeholders relevant to each specific process differ, individuals of the ITRM adoption process and the ERM adoption process may not be the same. The Chief Information Officer (CIO) or CRO will probably be the individual driving the process for ITRM, based on the earlier research findings (Beasley et al., 2005; Zhao et al., 2013).

2.5 Rogers' Diffusion of Innovation Theory

The definition of diffusion is defined by Rogers (2003, p.5) as the "*process in which an innovation is communicated in certain channels over time among the members of a social system*" and innovation is "*an idea, practice or project that is perceived as new by an individual or other unit of adoption"*. Once the innovation is communicated to individuals across the organisation, they are able to make more informed decisions, based on the information they received. The interpretation of the information contributes to the collective decision of the organisation to adopt the innovation (Rogers, 2003). The theory aims to reduce the doubt about the innovation in order to adopt or reject the innovation. The adoption of a technological innovation is dependent on a potential adopter's perception of the innovation (MacVaugh & Schiavone, 2010). Diffusion of innovation theory sets the foundation for further research theories in innovation adoption in information systems (Straub, 2009).

This theory is used as a lens in this research to identify the factors influencing ITRM adoption in universities. Considering that one may or may not need to understand why certain innovation was or was not adopted, the fact remains that legislation requires South African universities to implement ITRM. As such, individuals responsible for the selection of an appropriate framework need to be empowered to make an informed decision regarding which ITRM framework to adopt at the university. Sahin (2006) indicates that Roger's DOI theory may be applied to higher education and other educational environments during this process by citing the 2001 findings of Medlin and Parisot (Sahin, 2006), similar research in which influential factors for COBIT adoption in organisations making use of Rogers' DOI theory, were identified (Jo et al., 2010). Roger's DOI theory was also used in other IT adoption research (Mustonen-Ollila &

Lyytinen, 2003; Straub, 2009).

The following sections will examine the characteristics, Innovation-Decision process and critical reviews of Rogers' Diffusion of Innovation theory.

2.5.1 Perceived characteristics of Rogers' Diffusion of Innovation Theory

The DOI theory has key characteristics which is significant to the way in which the innovation is diffused and then adopted by organisations (Rogers, 2003).

i. **Relative advantage:** is the way in which others perceive an innovation to be better than an existing innovation. They will therefore look at the key strengths of the innovation and compare to the previous innovation. Where the advantages of the innovation provide greater benefit to the organisation, the possibility and rate of adoption will be higher.

ii. **Compatibility:** is the way in which the innovation fits into the existing needs of the individual or organisation. This is relevant because the innovation will be adopted by individuals comprising the social system. It therefore needs to cater for their requirements and must be well suited for this reason. If the innovation is not compatible with the organisation, it will not only affect the possible adoption of the innovation but also the rate at which it is adopted.

iii. **Complexity**: is the perceived level of effort it takes an individual to grasp the innovation. The individuals need to understand the ease of use of the innovation to gain a better understanding. The rate at which individuals start to understand the innovation will affect the adoption rate of the innovation.

iv. **Trialability:** provides individuals or organisations the ability to use the innovation for a limited period on a trial basis allowing them to engage and form opinions on the use and complexity of the innovation.

v. **Observability**: the manner in which the innovation is visible to the individuals, they are able to make more meaningful observations and decisions. This will therefore increase the rate of adoption, as they are able to understand the innovation clearly.

In addition to these attributes, Rogers (2003) also advocates that the qualities of the potential adopter will influence the adoption process. Some of these qualities of the individual are education, social status and innovativeness. Rogers (2003) also states

that the more similar these potential adopters are, the more likely the innovation will be adopted due to a shared understanding of the innovation.

Rogers' (2003) theory has four key elements; *Innovation, Communication channels, Time and Social System*. Sahin (2006) summarised Rogers' key elements:

i. *Innovation:* Although innovation might not be new to some individuals, others who have not come across it before will perceive it as being innovation. There are often hurdles when adopting an innovation and this can be reduced by providing the user of the innovation with sufficient information. Once they have absorbed the knowledge, they are able to make informed decisions about whether or not to adopt it.

ii. *Communication Channels:* There needs to be clear methods of communication using various media amongst individuals or groups to disseminate information about the innovation. All individuals who are part of the communication strategy needs to have a common understanding of the information being disseminated. Therefore, the information needs to be clear and to the point taking into consideration the differing backgrounds of the individuals. The different groups or business units receiving this information need to come to the same understanding.

iii. *Time:* Time is an important factor in the Innovation-Diffusion process because individuals need to be able to make informed decisions within a relevant time frame.

iv. *Social System:* a group of units who are all involved in achieving the same outcome. The various units in the business have an impact on the individual's opinion of the innovation as they have their own preconceived ideas based on their experience and backgrounds.

2.5.2 The Innovation-Decision Process

In Figure 5, the Innovation-Decision process steps the individuals through a process of collecting the information and fully understanding the innovation. Once they have completely grasped the innovation without any reservations, a decision is made to either adopt or reject the innovation (Rogers, 2003).

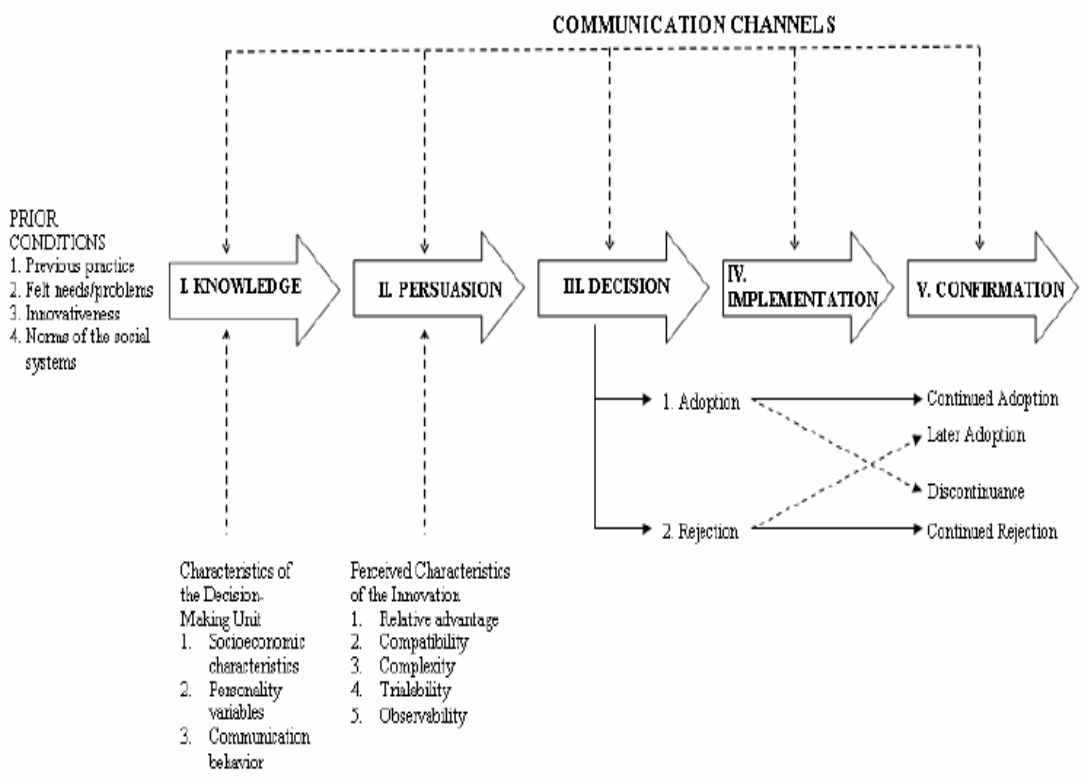


Figure 5: A Model of Five Stages in the Innovation-Decision Process (Rogers, 2003)

During the first stage, *Knowledge*, individuals acquire the knowledge about the innovation. They will look at what the new innovation is, why it is needed and how it functions (Rogers, 2003). Similarly, the researcher will consider the same type of questions in this research and refer to prior knowledge that individuals may have acquired. During this process, consideration of the social aspect of a university is also crucial.

In the *Persuasion* stage, the individuals form an opinion about the innovation that may influence their decision to adopt or not. During this stage, it is vital that the individual obtains sufficient information from colleagues or peers as it could sway their decision to adopt or reject the innovation. Colleagues or peers are often seen to be more credible sources of information due to their own experiences. As a result, individuals might be steered towards siding with their peers (Rogers, 2003). The researcher would therefore use this theory to see what the opinions are for using IT risk management frameworks in a university.

During the last two stages of the Innovation-Decision process, *Implementation* and *Confirmation*, the innovation is implemented into the business. The decision makers could at any point during these two stages, revert back their decisions. Therefore, it is imperative to ensure that there is a change management process in place with

minimal disruption to the business. The users of the system need to feel that they have made the correct decision by using the system and seeing the value of it to the business (Rogers, 2003). Although IT risk management adoption is not an information system, but a process, it is also catered for in this process of Innovation-Decision and allows the researcher to explore the various factors influencing decisions to adopt a framework. The adoption of technology is heavily influenced by individuals, the organisational culture, change within the organisation and other social pressures, both internal and external to the organisation (Rogers, 2003).

2.5.3 Adopter Categories

Individuals do not tend to adopt innovation all at the same time and therefore these individuals have been categorised into groups to determine when they first started using the new innovation (Rogers, 2003). The categorisation used to distinguish the different kinds of adopters does not refer to those who do not adopt the innovation. These categories are innovators, early adopters, early majority, late majority and laggards.

Innovators are the individuals who are always willing to embrace change and are keen to use innovations and provide feedback to others within the social system. They are able to provide both positive and negative feedback, however not all of the other individuals of the social system might trust their judgements (Rogers, 2003).

Early adopters are those individuals who will use innovation after the innovators have tested it and informed them of its usefulness, they will then update others of the innovation and inform them of the benefits (Rogers, 2003).

Early majority are those individuals who will only start to embrace the innovation once the benefits are known and the perceived usefulness is clear. The majority of individuals normally adopt an innovation and are classified therefore as early adopters (Rogers, 2003).

The *late majority* group of individuals are often seen as the sceptical individuals and will only adopt an innovation once most of the individuals have implemented. They will wait to see that everything is working and there are no issues. Lastly the *laggards* are the last group of individuals who will choose to adopt an innovation as they don't like change and will only do so if they are left with no choice (Rogers, 2003).

In relation to the study to determine the factors influencing the decision to adopt ITRM

frameworks at universities, adopter categories might not be applicable to the research as ITRM frameworks must be implemented in accordance with the HEA. ITRM implementation could however be delayed by certain areas in the IT department. This possibility will be explored at the participating universities during the data collection stage.

2.5.4 Critical Review on Rogers' Diffusion of Innovation Theory

It has been noted by several researchers that Rogers' DOI theory is used extensively in adoption research however it lacks the ability to provide detailed information on the decision-making process to adopt the innovation (Alotaibi & Wald, 2013; MacVaugh & Schiavone, 2010; Straub, 2009). Even if an innovation is technologically advanced and the organisation will benefit from it, it may not be adopted and explaining this phenomena could be complicated using the DOI theory (Tatnall, 2003). Furthermore, Tatnall (2003) affirms that a more appropriate theory that fits technological innovation is Innovation Translation. Innovation Translation looks at both human and non-human factors when adopting innovation and it is weighed up against Innovation Diffusion. Innovation Translation refers to the innovation framework which allows individuals to understand why a particular innovation was not adopted or why the adoption rate is slow (Tatnall, 2003).

A crucial concept of innovation one may need to understand is the reasons some individuals adopt innovation, while others choose not to adopt that same innovation. Straub (2009) used a combination of theories in technology adoption to explain this concept i.e. Rogers' DOI theory, the Concerns-Based Adoption Model, the Technology Acceptance Model and the United Theory of Acceptance and Use of Technology. He chose these theories based on a review of literature where it was the more commonly used frameworks in Information Systems (IS) research. He argues that there is not one model that can explain the Innovation-Decision process which an individual experiences in its entirety (Straub, 2009).

The adoption of innovation in complex network technologies had some pitfalls using the theoretical constructs to understand diffusion in such an environment. (Lyytinen & Damsgaard, 2001). This environment however is not relevant to the research of ITRM framework at a university. Diffusion of innovation is acknowledged as the prominent theory used in adoption of innovation by the authors, Lyytinen & Damsgaard (2001).

In research focused on small business and using Rogers' DOI theory, the author

proposes that the Innovation-Decision process is not a linear process but a more repetitive process which runs in parallel to each other (Nooteboom & Nooteboom, 1994).

In a research study which explored IS process innovations using Rogers' DOI theory it was found that the failure to address factors influencing the implementation of innovation could lead to failure of the process and wasted finances (Mustonen-Ollila & Lyytinen, 2003). Conversely, research which studies the factors influencing ERM adoption in an organisation, indicate that there is a positive correlation between a comprehensive risk governance structure and an effective implementation of risk management (Beasley et al., 2005).

2.6 Conceptual Research Framework

The conceptual framework depicted in Figure 6 has been adapted by the works of previous researchers in this area (Amalina et al., 2012; Beasley et al., 2005; Bhattacharjya & Chang, 2006; Fadun, 2009; Govender & Pretorius, 2015; Hudin & Hamid, 2014; Jo et al., 2010; Kanhai & Ganesh, 2014; Lundquist, 2011; Van Niekerk & Maree, 2004; Rogers, 2003; Zhang & Zhou, 2014; Zhao et al., 2013). A multitude of factors have been grouped into internal and external factors. Each has an influence on the decision to adopt an ITRM framework. Internal factors are those factors which exert an influence from within to the organisation and external factors are those factors influencing the decision from outside of the organisation. External factors include regulatory and legal (Amalina et al., 2012; Govender & Pretorius, 2015; Republic of South Africa, 1997; Zhou, Vasconcelos, & Nunes, 2008). Some of the internal factors include the size of the organisation, corporate governance and strong leadership (Amalina et al., 2012; Fadun, 2009; Hudin & Hamid, 2014; Kanhai & Ganesh, 2014). The factors are highlighted in Table 2.

The conceptual framework draws on the Innovation-Decision process (Rogers, 2003) to decide on which ITRM to adopt. The process highlights the key factors that would influence the decision to adopt a specific framework over another.

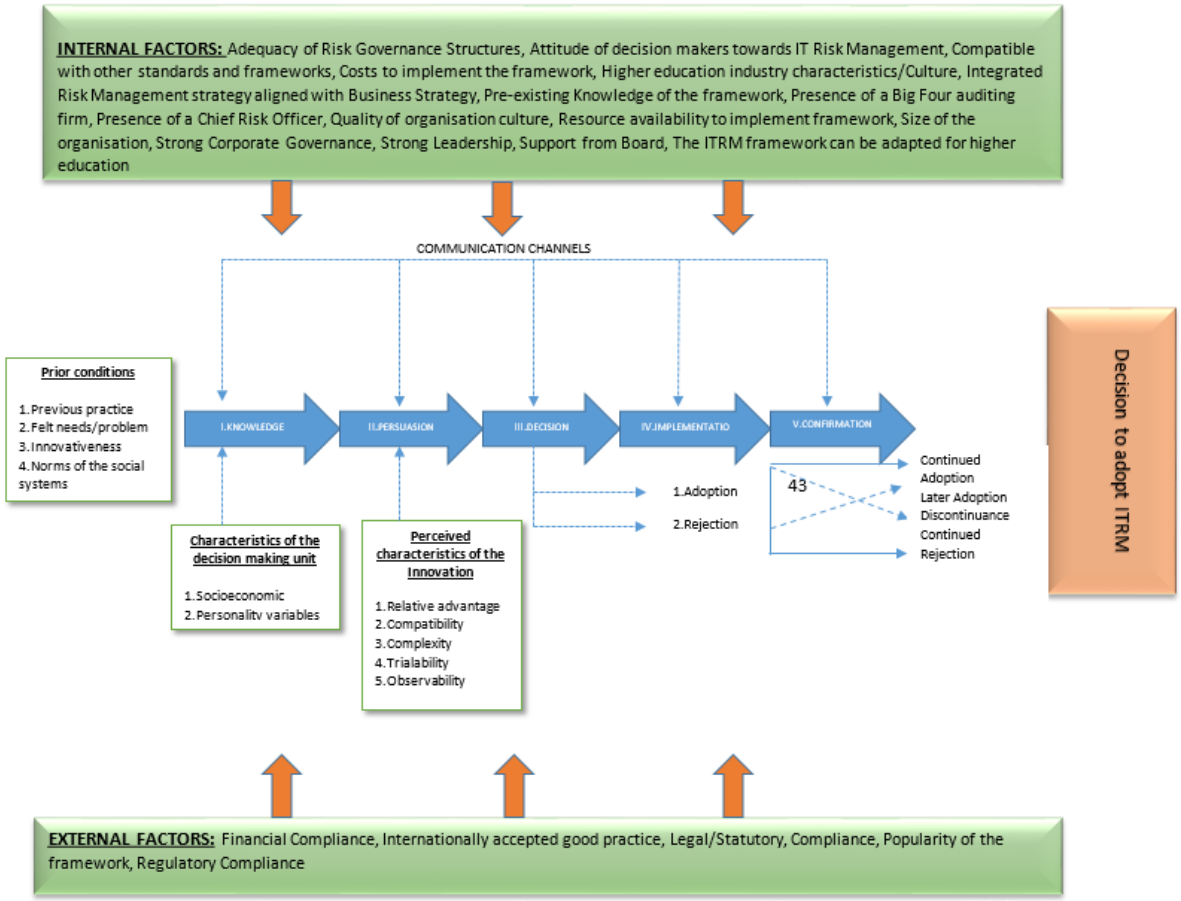


Figure 6: Conceptual Framework adapted from Rogers' Diffusion of Innovation Theory (2003)

2.7 Literature Review summary

Universities in South Africa are mandated by the HEA to implement IT governance controls. The act however does not prescribe which ITRM framework should be used at the university. The onus is on the university, to decide which ITRM framework to adopt. The decision to adopt a specific framework will depend on various factors before it can be adopted at the respective university.

In Section 2.4, the various factors influencing the decision to adopt an ERM and specifically ITRM were identified in different sectors of industry however none have focused exclusively on ITRM framework adoption at a university. The main factors influencing ERM adoption, which was identified from previous research across other business industries, provides the researcher with a greater understanding of the decision-making process. This will be accomplished using Rogers' DOI theory. The conceptual framework in Section 2.6 was therefore developed to discover the research questions.

The researcher is confident that in applying this framework to the research questions, further insight to the inconsistent adoption of ITRM frameworks at universities will be

uncovered. The next chapter, the research methodology; will explore the way the researcher will approach the data collection.

CHAPTER 3: METHODOLOGY

This chapter introduces the research methodology, where the methodology is described, referencing the literature.

3.1 Research Methodology

The researcher encourages gaining a deep understanding of the field of study, to answer the research questions. The researcher therefore relied on collecting information from knowledgeable experts in the ITRM field at universities to determine the motives for deciding to adopt a specific framework.

The research methodology for this research is described in the following sections:

3.2 Research Philosophy

The *Interpretivist* research philosophy, generally referred to as a qualitative approach, was appropriate for this research (Saunders, Lewis, & Thornhill, 2009). The researcher attempted to understand the individual's decisions at the universities, during the selection process of an ITRM framework. The individuals are the key staff members involved in IT risk management who plays a role in the decision-making process to adopt the ITRM framework. The motivation for choosing a specific ITRM framework is subjective and is dependent on the type of organisation structure (Pirani, 2013). Interpretivist studies in the IS field allowed the researcher to gain a deeper understanding about the individual's thought process (Myers & Klein, 1999). The researcher aimed to achieve this exact argument during the research, using the same approach. In addition, Myers & Klein (1999, p.69) claimed that "*IS research can be classified* as *interpretive if it is assumed that our knowledge of reality is gained only through social constructions such a language, consciousness, shared meanings, documents, tools, and other artifacts"*. The researcher agreed with this statement and therefore used the interpretivist philosophy, by expressing the participant's views accurately and inter-subjectively.

While a positivist philosophy would have been appropriate in this study (Myers & Klein, 1999), the researcher wanted to understand the social factors in this research, using a qualitative approach.

3.3 Research Approach

The *deductive* research approach was used to test existing theory to understand why specific ITRM frameworks are adopted in a university, using Roger's DOI theory. The decision making process was therefore the key focus with using the deductive approach. There was also existing literature highlighting factors influencing adoption of ERM (Ajami & Al-Qirim, 2013b; Amalina et al., 2012; Beasley et al., 2005; Fadun,

2009; Kanhai & Ganesh, 2014; Lundquist, 2011; Paape & Speklè, 2012; Zhao et al., 2013) in organisations. These factors have been incorporated into the conceptual framework in section 2.6 and tested in this research using an *inductive* approach (Saunders et al., 2009) in a university. The inductive approach was used to identify the factors from the data collected and developed the conceptual framework.

Similarly, the researcher believed that meaningful data in IS research could be found in documents, people, and other social structures. Data is not only found in statistical measurements however qualitative research provides one with a deeper understanding of the data, (Booth, Colomb, & Williams, 2008; Myers & Klein, 1999) within the relevant context.

3.4 Research Purpose

The researcher conducted an *exploratory* study to discover valuable new insights (Saunders, Lewis, & Thornhill, 2009) into the ITRM adoption phenomena at universities in South Africa. ITRM is a relatively new area of research especially at universities in South Africa and therefore further investigations were required in this field. Exploratory research is generally done by means of a literature review, interviews or conducting focus groups (Saunders et al., 2009). For this research, an extensive literature review was conducted, in addition to interviews with key staff members involved in ITRM at the university. Similarly, Bhattacharjya & Chang (2006, p.4) research used exploratory methods to answer his research question; *"How is formal IT governance adopted and implemented within the higher education environment in Australia?".* Data was collected through interviews and secondary documentation with senior staff involved in IT governance. This research used a similar approach when collecting data.

3.5 Research Strategy

As indicated previously, this research was conducted qualitatively and quantitatively using questionnaires and in-depth interviews. This strategy was selected to comprehend the problem at universities, where there is an inconsistent ITRM framework adoption. Qualitative research is characterised as a methodology to discover and comprehend how individuals or groups think, act and perform within a social setting (Booth et al., 2008). This involves collecting data through interviews, reviewing existing documentation and observation, followed by data analysis (Booth et al., 2008; Saunders et al., 2009). Similar research was undertaken in the adoption of ITRM at universities using qualitative research methodology (Bhattacharjya & Chang,

2006; Christopher & Sarens, 2015). The qualitative methodology approach aided the researcher in affirming the constructs of the research framework. Both of these strategies was expected to complement the data findings from the interviews and the questionnaires (Harris & Brown, 2010).

3.6 Timeline

When the university's ethics committee approved this research study, data was collected during June and September 2016. The data was then analysed throughout the data collection period. The researcher aimed to commence the data collection in March 2016 but ethics approvals were still outstanding. The research time frame for this study is thus cross sectional (Booth et al., 2008; Saunders et al., 2009) as the researcher did not do an additional round of data collection at a later stage.

The timeline for the research is highlighted in Table 3. The researcher had presented significant meetings with the supervisor and key deliverables in the table. There was additional informal meetings or communication throughout the research study that may not be depicted in the table.

Deliverable	Completed Date	Status
Research Proposal Presentation	16 March 2015	Complete
Meet with supervisor to review presentation feedback	27 March 2015	Complete
Research Proposal Submission	30 April 2015	Complete
Meet with supervisor to discuss proposal feedback	25 May 2015	Complete
Literature Review Submission	23 July 2015	Complete
Meet with supervisor to discuss literature review feedback	25 August 2015	Complete
Research Design (RD) Presentation	17 September 2015	Complete
Meet with supervisor to discuss RD presentation feedback	21 September 2015	Complete
Research Design (RD) Submission	19 October 2015	Complete
Meet with supervisor to discuss RD feedback	November 2015	Complete
Apply to Faculty of Commerce for Research Ethics Approval	23 November 2015	Complete
UCT Faculty of Commerce Ethics approval granted	8 December 2015	Complete
Apply for Research Ethics Clearance at University D	1 February 2016	Complete
University D Ethics Approval granted	4 February 2016	Complete
Apply for Research Ethics Clearance at University B	1 February 2016	Complete
University B Ethics Approval granted	8 February 2016	Complete
Apply for Research Ethics Clearance University C	4 February 2016	Complete
University C Ethics Approval granted	25 May 2016	Complete
Apply to Human Resources Executive Director: Approval to interview University A staff	9 February 2016	Complete
University A Ethics Approval granted	17 February 2016	Complete

Deliverable	Completed Date	Status
Data Collection	June - September 2016	Complete
Data Analysis	August - October 2016	Complete
Prepare Research Thesis	June – October 2016	Complete
Submit first draft of thesis	1 November 2016	Complete
Meet with supervisor to discuss progress (recurring meetings)	November 2016	Complete
Submit second draft	November 2016	Complete
Complete and submit thesis	December 2016	Complete

Table 3: Research Timeline

3.7 Data Collection

Data collection commence after the ethics approval was obtained from each of the participating universities. Analysis of questionnaires, interviews and document were performed qualitatively with quantitative elements in the questionnaires (Harris & Brown, 2010). The data for both the interview and the questionnaires were analysed independently and correlated to the research framework (Harris & Brown, 2010). Questionnaires are predominantly used in quantitative research but can also be used in qualitative research to obtain information from a broader community, when interviewing all participants is not feasible (Saunders et al., 2009). The data was triangulated using multiple data collection methods to ensure quality of the data (Saunders et al., 2009). The quantitative data could therefore be presented qualitatively. The data validity of the questionnaire and interview data referred to the credibility of the data collected (Booth et al., 2008; Saunders et al., 2009). The validity was tested by corroborating the statistical data with the qualitative data (Harris & Brown, 2010; Saunders et al., 2009).

3.7.1. Questionnaires

The questionnaire was tested with a pilot target population to ensure the questions were easy to understand and the responses were adequately addressing the research questions (Saunders et al., 2009). When the questionnaire tested successfully, it was ready for distribution to the target population. Questionnaires were sent to the potential target population consisting of senior management in the IT department as well as other senior staff in the university who contributes to risk management decisions in the university (Bhattacharjya & Chang, 2006; Yanosky & Caruso, 2008).

The questionnaire included a cover letter addressing the target population, explaining the research and requesting their participation. The letter highlighted that participation was voluntary and their identity would remain anonymous. The questionnaires were

sent to ascertain the development of their university's ITRM efforts thus far, if any.

The questionnaire was developed based on a consolidation of previously used questionnaires in studies of a similar nature (Ajami & Al-Qirim, 2013a; Bhattacharjya & Chang, 2006; Govender, 2013; Viljoen, 2005) . The pertinent questions for this research were selected from earlier research. The questionnaires were available on an online questionnaire tool called Qualtrics, which was freely available from the researcher's university. The researcher therefore had access to Qualtrics to create the questionnaire with all of its available features, and there were no additional costs. The questionnaire was made available online as this allowed for easy access for the participants. This also allowed the researcher to extract the data captured by the participants effortlessly from Qualtrics' repository. The data therefore was not captured manually into another tool for analysis. Qualtrics tool yielded no limitations to the researcher as all functionality was available.

The questionnaire began by obtaining data about the participant's job function, years of experience and his/her university. None of this information was divulged in the research, but was a part of the data analysis. The participants' names were not required for the research and was optional to provide. Their job function and years of experience was required for further analysis. Their level of experience gave some insights into their decision-making strategies (Bhattacharjya & Chang, 2006; Viljoen, 2005) . The universities' names were altered using pseudonyms throughout the thesis (Saunders et al., 2009) namely University A, B, C and D.

As this research adopted a qualitative stance, the questionnaire included limited open ended questions. Saunders et al. (2009) explained that questionnaires were not generally used in exploratory research, as it is not conducive to have many open ended questions in a questionnaire. However, it is used in quantitative research to establish facts (Harris & Brown, 2010). Furthermore, a combination of Likert scales and itemised ranking scale questions were used in the questionnaire, based on questionnaires from earlier research (Ajami & Al-Qirim, 2013a; Bhattacharjya & Chang, 2006; Govender, 2013; Viljoen, 2005). Likert scales were predominantly used in quantitative studies where it allowed the participant to choose from predetermined answers (Harris & Brown, 2010; Saunders et al., 2009). Ranking scale questions were often used to determine the importance of an item. The participant was required to rank the item in order of importance (Saunders et al., 2009). The internal and external factors in Table 2, influencing the decision to adopt an ITRM framework, were used in

the ranking question. This provided the researcher with a list of key factors at the four participating universities. There were options for participants to clarify their choice in text boxes in certain questions (Saunders et al., 2009). This provided further insight into their responses.

The questionnaire research instrument has been inserted to the Appendix section; Appendix 8.8. The questionnaire was deactivated after a period of time to ensure that no additional data was captured by new participants during the data analysis stage. A reminder email was sent to the participants to complete the questionnaire by the 15th of June 2016. The questionnaire was then deactivated on the 15th June.

Data analysis: Questionnaire

The questionnaire results were analysed using the application, Nvivo. The questionnaire was imported into Nvivo from Qualtrics, in a Microsoft Excel format. Nvivo is a tool used to code and analyse your qualitative data. Nvivo has the functionality to incorporate quantitative data by importing the data from Qualtrics. Although the researcher is a novice user of Nvivo, the researcher has consulted help and training documentation on how to use Nvivo on their website (QSR International, 2015) to become more familiar with the use of the tool. The resources include videos and documentation on the functionality of the application. In addition, the researcher had sought assistance from current Nvivo users who have the working experiencing using the tool.

3.7.2. Interviews

Interpretivist studies generally require smaller samples as the data collection during interviews are more in-depth (Saunders et al., 2009). Bhattacharjya & Chang (2006) selected two senior IT decision makers and two senior business decision makers for their semi-structured interviews. Their exploratory study looked at the implementation of IT governance frameworks (ITIL, COBIT, and ISO 17799) at two Australian universities. This research undertaking is similar to this research and therefore a similar number of participants were selected. This was dependent on each university's ITRM undertaking.

In addition to the initial questionnaires, interviews were conducted with key staff members at the various universities who are involved in selecting an ITRM framework at their respective universities. *Semi-structured* interviews provided the researcher with the opportunity to choose selected questions based on the research objectives

and questions (Saunders et al., 2009). Furthermore, the interview questions were not in chronological order as it was dependent on the context of the conversation with the interviewee. Questions were therefore asked in any particular order and additional questions were asked, which was not part of the initial list of questions (Booth et al., 2008). Therefore, the style of the interview was classified as semi-structured.

In a similar research study, which focused on IT governance in higher education, semi-structured interviews were held with the CIO at each of the universities (Ajami & Al-Qirim, 2013a). Similarly, Wessels & Van Loggerenberg (2006) also used semi-structured interviews in their research on IT governance, using open-ended questions. Using this type of questioning, allowed the interviewee the opportunity to respond openly, without feeling restricted in their responses (Saunders et al., 2009). Studies which were very similar in nature to this research also used semi-structured interviews to collect some of their data (Bhattacharjya & Chang, 2006; Govender & Pretorius, 2015; Lubambo, 2009; Yanosky & Caruso, 2008).

The interview participants were determined based on their job function at the university, in relation to the selection of ITRM framework. It was preferable to conduct the interviews with key stakeholders who were a part of the decision-making process at the university. The potential interviewees were contacted based on their preparedness, which was indicated in the questionnaire, to conduct further interviews. Once they confirmed the interview and signed the consent form, appointments were scheduled. The researcher requested permission to record the interviews at the beginning of each interview. The recording of the interview was accomplished using a Huawei smartphone and the sound quality was tested beforehand using various settings on the phone. The recording was required to refer back to the interview, during data analysis and to produce transcripts.

Data analysis: Interview

The interview was transcribed using a free online tool at http://otranscribe.com/. The tool allowed the researcher to upload the recording of the interview in the original .m4a format and transcribe directly on the web browser window, while having the capability to pause, rewind or slow down the recording simultaneously. The tool similarly allowed the researcher to transcribe offline, where there was no internet connection available. Once transcribing was completed, the researcher reviewed the interview recording using a smartphone Android application, AudiPo, to ensure accuracy of the text transcribed earlier. This application allowed one to listen to a recording from the phone

and easily pause or slow down the recording, while confirming the transcribed text. This application was selected as it was available freely on the Google play store and the features complemented the transcribing process, as opposed to the Android's native application, Music. It was easier to use Audipo when reviewing the recording to ensure that one could read quicker, edit easily and listen attentively.

The data analysis was done using Nvivo where the qualitative data was structured into meaningful data using thematic analysis. Nvivo makes use of thematic analysis to categorise data into themes which will form a theory based on the data collected (Hutchison, Johnston, & Breckon, 2010). Thematic analysis uses the qualitative data obtained from interviews, analyses it by breaking down the data into categories or patterns. A theme will emerge from the various patterns and the data becomes more meaningful. Thematic analysis is often used in inductive research approaches (Saunders et al., 2009).

3.7.3. Secondary data (documents)

Lastly, the researcher analysed documents related to risk management at the university; such as policies, procedures, annual reports, risk management tools and risk strategy which is referred to as secondary data (Saunders et al., 2009). Not all the documents analysed were directly related to risk management but contributed towards the analysis of the research. The documents were analysed and coded using grounded theory in Nvivo (Hutchison et al., 2010) and is discussed in the findings of the final output of this research.

3.8 Target population

The universities selected for this research are all members of the Association of South African University Directors of Information Technology (ASAUDIT). The association's goal promotes information technology practices at universities and the development of skills.

The target population for this research were the key staff members involved in ITRM at the four public universities in the Western Cape, South Africa. Although the exact number of research participants was not known at each university, the researcher aimed to interview at least two ITRM decision makers and required at least 10 staff involved in ITRM (Bhattacharjya & Chang, 2006; Yanosky & Caruso, 2008) at each university to complete the questionnaire.

The researcher had to limit the research to the Western Cape province only as there

were considerable quantities of secondary data (documents relating to the risk management of the organisation) expected to analyse at each university. Due to time limitations for completing the part-time Master's degree, the Western Cape was selected. In addition to this limitation, ethics approval also had to be obtained for each university, which in turn delayed the data collection. Amongst them were two of the top universities in Africa (Bothwell, 2016; Business Tech, 2015). The researcher therefore assumed that ITRM would be in place at these two universities. The other universities are equally well established in the Western Cape and share a listing on the same ranking scale.

Once ethics approval was obtained from all the ethics committees at the various universities, the researcher requested ASAUDIT to distribute the questionnaire to all of its members. Only participants from the target universities were required to participate. This was required to ensure that all key staff members were included with the questionnaire and interview participation requests. The sample size varied for each university as they may not have many staff dedicated to IT risk management or have no ITRM in place.

Participation in the research was voluntary and therefore the objectives of the research were emphasized, highlighting the contribution made to the higher education field.

In addition, the questionnaire was sent to University A's risk committee servicing officer and Internal Audit management as the researcher had access to contact information.

3.9 Access, Privacy and Confidentiality

The researcher obtained ethics approval from the University of Cape Town, Faculty of Commerce's ethics committee prior to any data was collection. In addition to this, ethics approval was obtained from each of the four participating universities, permitting the researcher to engage with staff at the respective universities. The researcher had identified and clarified the ethics approval process at each of the universities prior to application. Ethics approval had to be obtained from the University of Cape Town before initiating the ethics approval process at each of the universities.

Furthermore, consent was required from the Executive Director of Human Resources at the University of Cape Town to engage with staff from the university. To initiate this process, the ethics approval was required from the associated ethics committee.

The participating staff from the respective universities were requested to participate in the research on a voluntary basis and could withdraw at any stage. The data collected in the research was not associated with a university's name unless specific permission was granted, if required. The use of pseudonyms was sufficient in this research. Anonymity and confidentiality was endorsed for all participating universities as the researcher had access to confidential information. Some personal biographical data was collected in this research and the only identifiable data was the staff member's job function and name. This was used by the researcher for analysis purposes only and was optional for the participant to declare.

Participants who were invited for an interview, received a consent form for the interview. The signed consent forms have been inserted at Appendix Sections 8.13 – 8.15 however names have been redacted to protect anonymity. The questionnaire participants were requested to participate in the questionnaire however, no consent was required as the questionnaire is voluntary.

Where the participant requested a copy of the final thesis, it will be provided to them after final submission and examination. The researcher did not foresee any monetary expenses required for this study and none of the participants was rewarded for participating in the questionnaire. No additional human resources were required to assist with the research on behalf of the researcher.

3.10 Limitations and assumptions

Due to time constraints for completing the thesis, the researcher preferred to interview additional public universities across South Africa and not limited to the Western Cape only. The researcher assumed that all public universities in South Africa had an IT risk management framework in place due to legislative requirements by the HEA to have IT governance in place. The four universities in the Western Cape, South Africa was representative of the remaining universities in South Africa. All universities in South Africa are mandated by the HEA to report directly to the Minister of Higher Education and Training regarding all matters of their respective institutions.

An additional limitation, inhibiting the inclusion of all public universities in South Africa in this research, was that additional ethics clearance had to be obtained from each university. While this appeared to be a straightforward process, there are twenty-six public universities with each having its own ethics clearance process. This would probably have taken a considerable amount of time to obtain for this study. Therefore, with the limited time constraints to complete the Master's degree, only four local

universities were selected in the Western Cape.

Due to the small number of participants for this qualitative research, the study was heavily impacted by participants withdrawing or not participating.

CHAPTER 4: DATA ANALYSIS

4.1 Chapter outline

This chapter dissects the data collected from the questionnaire, interviews and secondary data from the participating universities. All data collected from questionnaires and interviews were obtained after all ethics approvals were obtained from all participating universities. Therefore, questionnaires were sent out later than originally anticipated. Obtaining approvals from some universities was not approved timeously. The questionnaire was first sent to University A as a pilot group to ensure the questions were clear and understood by the reader. The questionnaire was sent to other universities once ethics was approved at the respective universities. The data collection stage was discussed in the previous chapter and therefore this chapter will delve into the data to identify emerging themes to answer the research questions. These findings will be discussed in detail in the next chapter, Research Findings.

4.2 Questionnaire Results

The questionnaire was initially tested with University A as a pilot group where all IT managers were invited to participate. The initial email request was sent to the Executive Director of the IT department in early March 2016, requesting to distribute the questionnaire participation request to all his contacts at the various universities in the Western Cape when the questionnaire was complete. At the beginning of April, the formal questionnaire participation request was sent to the Executive Director. The response rate to the questionnaire was not very positive as only one respondent completed questionnaire. The researcher followed up on the email and a reminder email was sent. Subsequent to sending the reminder, email the researcher distributed the questionnaire to all IT managers at University A, as they all were involved in some way with IT risk management.

Because the researcher did not have access to individuals' email addresses or job functions, the participation requests for the remaining universities were sent through ASAUDIT who has mailing lists for the relevant IT staff. The researcher was therefore dependent on an existing contact to forward the questionnaire to other universities. The final response rate did not increase at the optimal rate and amounted to twenty-four responses from all the participating universities. Almost half of the responses were either incomplete or no information was provided. Therefore, the submitted data was not valid for analysis purposes.

The questionnaire results were exported from Qualtrics into a Microsoft Excel format and then imported into Nvivo 11. The process was easy however interpreting the data in Nvivo required further help with the aid of training material. The researcher found the coding of data easy and useful but mapping the data from the different sources was challenging, as the researcher was new to the tool.

4.2.1. Data Analysis: Questionnaire

The questionnaire was launched by gathering personal and geographical data from the participants to ensure there were sufficient numbers from the participating universities and to contact them for further interviews. As indicated, participants will remain anonymous throughout the research and will be identified with the use of pseudonyms.

The response rate for the questionnaire was slow and minimal, despite the email being disseminated by a reputable organisation. Table 4 has been included to highlight this fact. Although the questionnaire was available for over three months, the response rate was still incrementally slow and only peaked on 17 May when a reminder email was sent to the participants. Where participants did not complete the questionnaire, but provided their email address, the researcher contacted them individually requesting them to complete the questionnaire. Qualtrics tool however created a new response for a participant when they completed the questionnaire, thus the incomplete record remained as part of the questionnaire results.

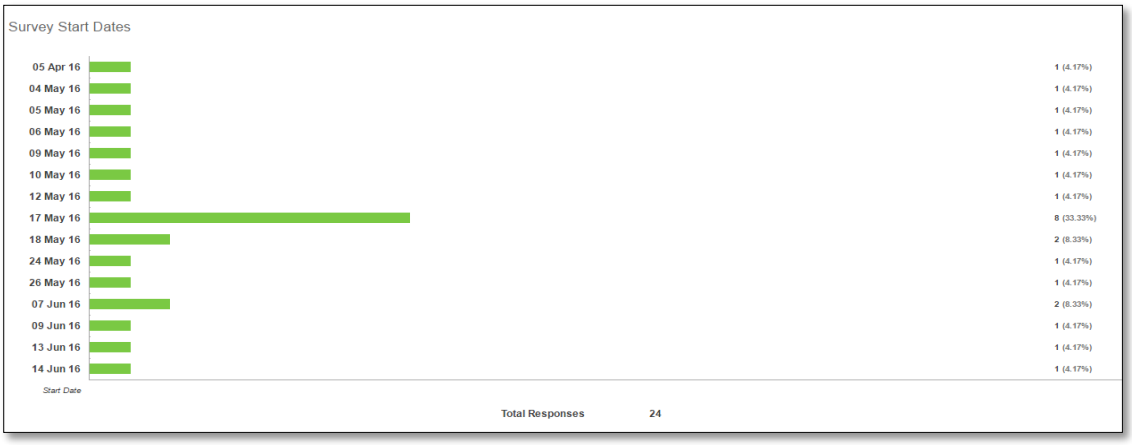


Table 4: Questionnaire start times

While the number of responses is recorded at 24, almost half did not complete the questionnaire and there are not 24 answers for every question. The incomplete questionnaires hindered correlation analysis, but themes still emerged for qualitative analysis. The dropout rate for the questionnaire is in Table 5. Therefore, the remaining

results did not provide the researcher with sufficient data, representative of each university and was evident in the results. The researcher was not able to make more generalised conclusions as the results were relative to each participant's experience or knowledge.

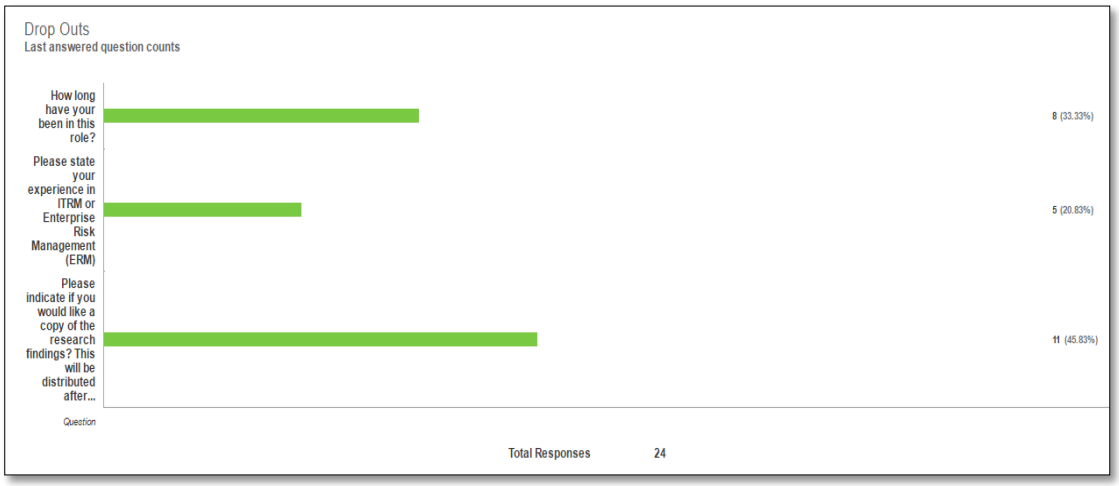


Table 5: Questionnaire Drop Out Rate

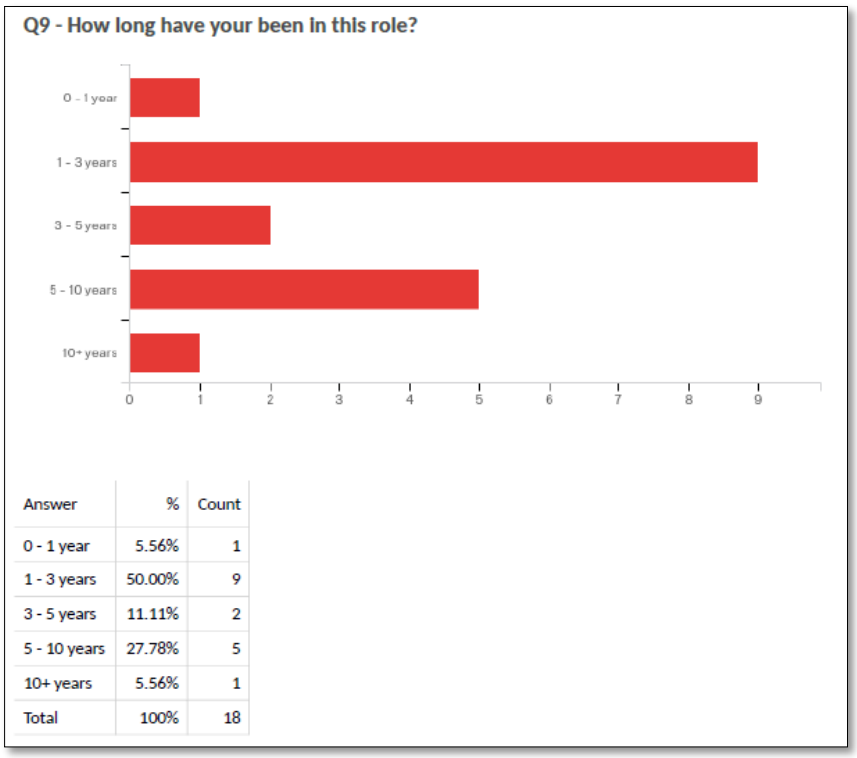
In Table 6, the questionnaire participants were IT experts from their respective fields, which included IT line managers, engineers, directors and IT risk specialists across the entire IT department. More than half of the participants originated from University A, two from University B and one each from University C and D. Staff involved directly and indirectly with risk management submitted the completed questionnaire responses.

Q5 - What is your current job function/title at your university?
What is your current job function/title at your university?
Manager - IT Service Desk
Director: Risk Compliance
IT Risk & Compliance Officer
Line Manager
Line Manager
Manager : IT Projects and Portfolio
Senior Systems Engineer
Helpdesk Conslutant
Systems Administrator
Senior Manager: Educational Technology Services
Senior Manager: Educational Technology Services
Senior Systems Engineer
Senior Manager : Core Business Systems
Network Manager
Director: IT
Systems Portfolio Manager
Director: Systems Division
EDICT

Table 6: Job Functions from all participants

Table 7 presented participants' years of experience in their current job functions. The

job functions were relevant to this research as it could influence the participant's decisions for selecting a suitable framework, based on their own experiences. The participants had many years of experience in their existing roles and were involved in risk management in their IT roles. Most of their working experience was between 1 – 3 years at the university in their current job functions, while others had up to 10 years' experience in their existing roles.



Answer	%	Count
0 - 1 year	5.56%	1
1 - 3 years	50.00%	9
3 - 5 years	11.11%	2
5 - 10 years	27.78%	5
10+ years	5.56%	1
Total	100%	18

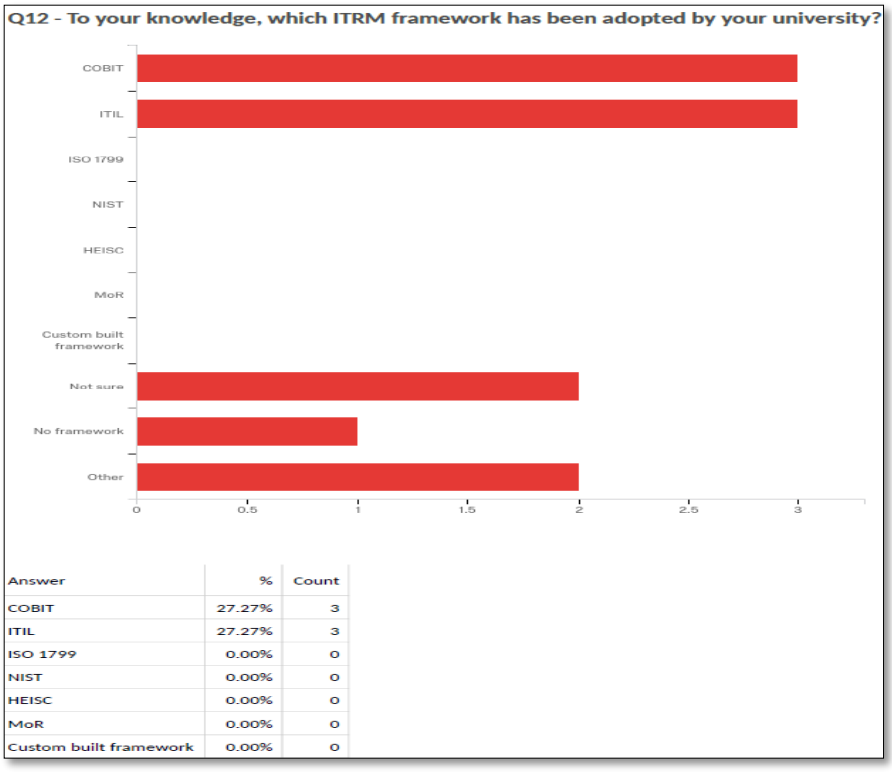
Table 7: Years of experience in current role

The researcher attempted to understand what each participant's experience in ITRM or ERM was, as the latter questions in the questionnaire was geared towards people who are knowledgeable of ITRM frameworks and the responses would be relative to their own experience. Table 8 indicated the participants' experience with risk management. As indicated some had no experience, others had limited experience and the remainder had the experience in dealing with risk management.

Q10 - Please state your experience in ITRM or Enterprise Risk Management (ERM)
Please state your experience in ITRM or Enterprise Risk Management (ERM)
I do not have any experience in ITRM or ERM
Over 3 years experience but no formal qualification in ERM
My role is responsible for risk management within the IT department as well as reporting on risk to the following committees of council: - IT Governanace Committee - Audit and Risk Oversight Committee
minimal
Health & Safety risk management and security of AV/IT equipment is a core component in the environment where I provide a service.
Intermediate level.
No specific experience
My day-to-day role doesn't require ITRM experience, however, I was the infosec project manager for 7 months and created the initial policy documentation.
minimal
Intermediate some knowledge and limited practice, mainly contributor.
Identifying IT related risks and mitigation strategies
As part of change management process I have been exposed to it for quite a while
responsible for annual IT audit feedback; dealing with risks as part of IT management portfolio
Minimal
SOme exposure as part of an IT management team (2 years)
Developing risk registers for ICT 5 years

Table 8: Participants ITRM Experience

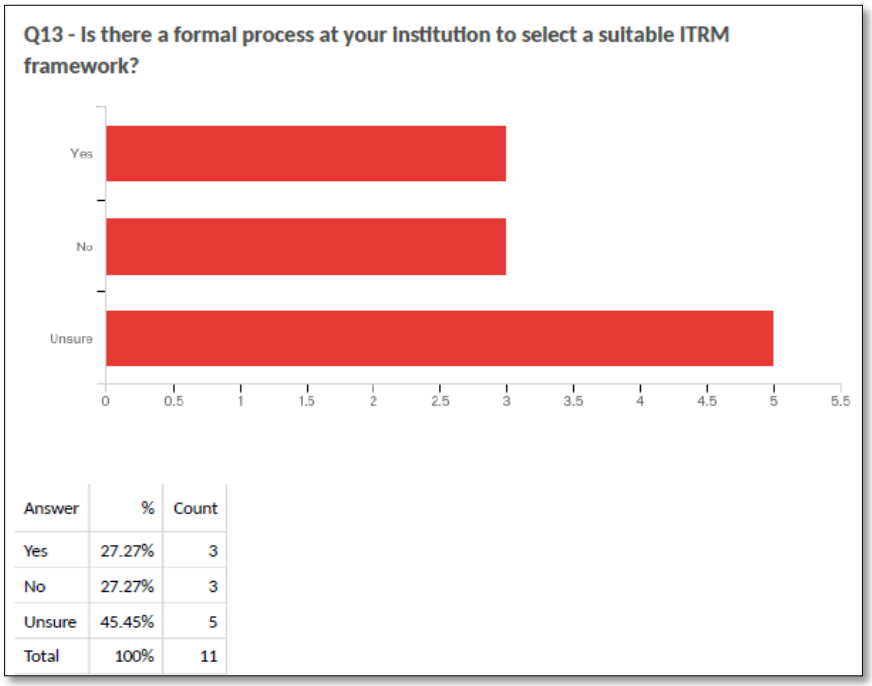
The researcher identified if the participants knew which ITRM framework was used at their university and based on the results, the feedback was quite diverse as indicated in Table 9. The feedback indicated that some IT staff are not aware of the university's ITRM adopted frameworks, if any.



Answer	%	Count
COBIT	27.27%	3
ITIL	27.27%	3
ISO 1799	0.00%	0
NIST	0.00%	0
HEISC	0.00%	0
MoR	0.00%	0
Custom built framework	0.00%	0

Table 9: Participants response to Q12.

Question 13 presented in Table 10, also indicated diverse responses where many participants were not certain which, if any formal process existed for selecting an ITRM framework at their university.

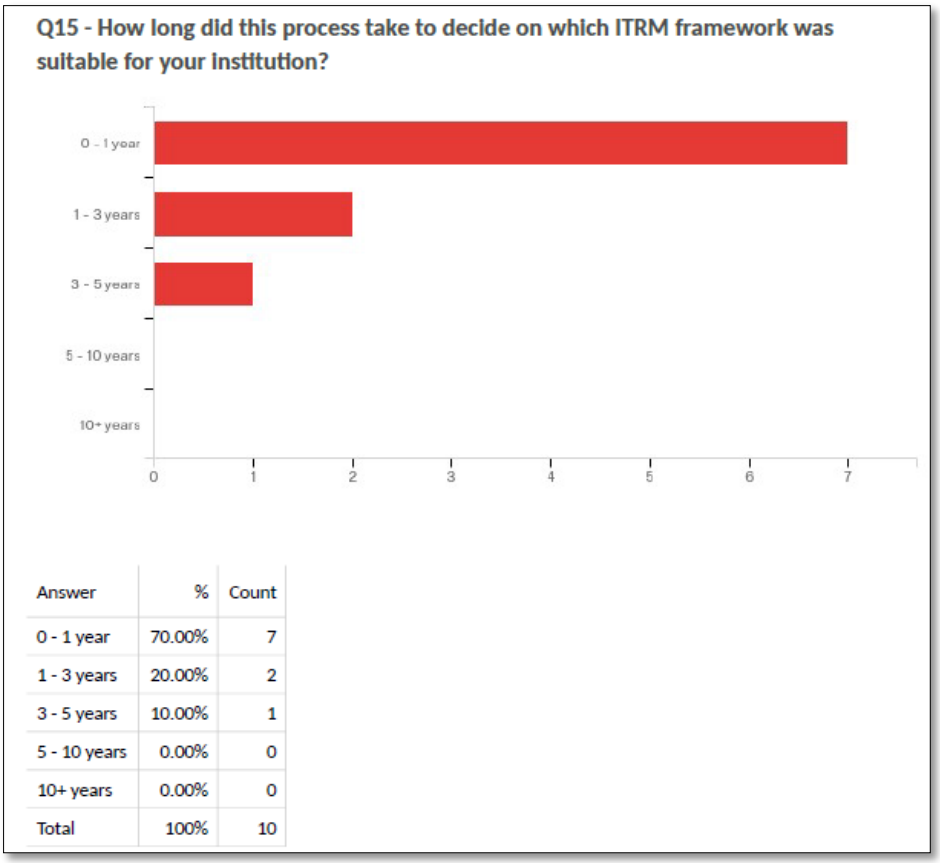


Answer	%	Count
Yes	27.27%	3
No	27.27%	3
Unsure	45.45%	5
Total	100%	11

Table 10: Formal Process at the university?

Participants who were aware of a formal process indicated that it took up to a year to adopt the selected framework. Other universities took up to 5 years to adopt the

framework as presented in Table 11. Based on the responses, the framework was selected and adopted within a year.



Answer	%	Count
0 - 1 year	70.00%	7
1 - 3 years	20.00%	2
3 - 5 years	10.00%	1
5 - 10 years	0.00%	0
10+ years	0.00%	0
Total	100%	10

Table 11: No of years to select ITRM Framework

Only some of the participants were directly involved in the ITRM adoption process but as IT experts, they were involved in some way in IT risk management in their respective areas. Table 12 presents this information.

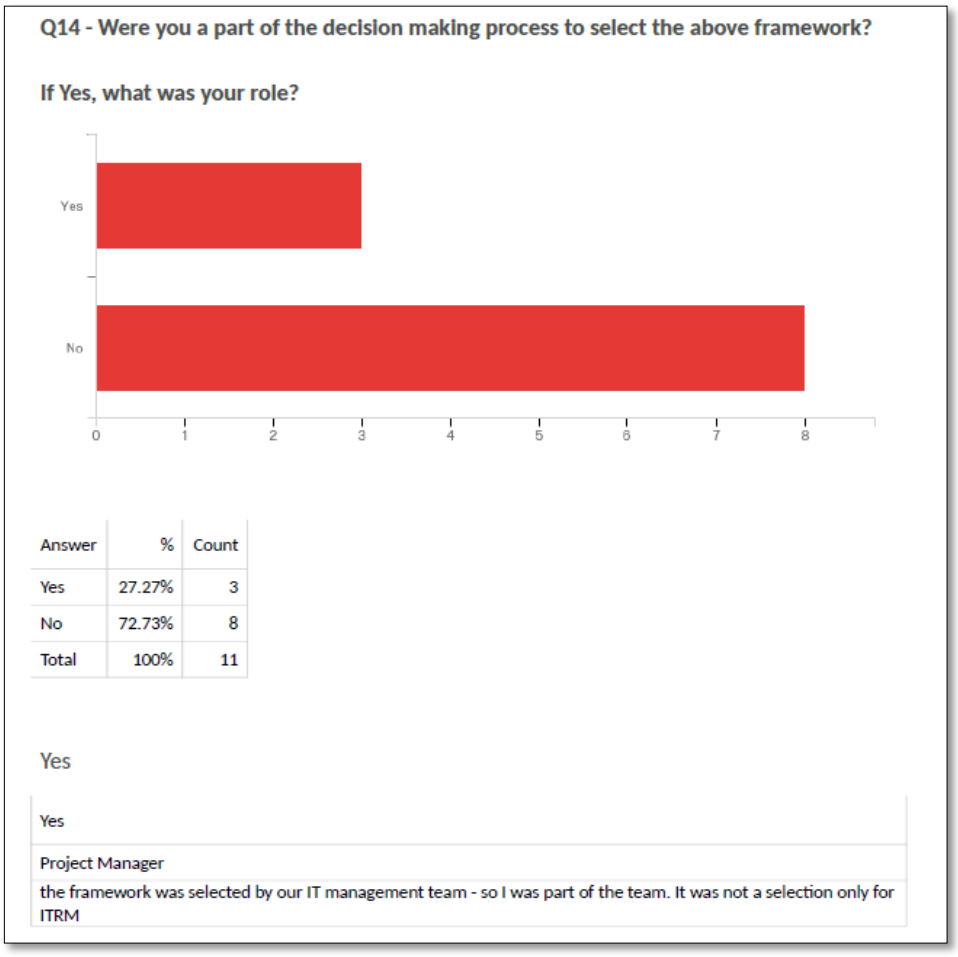


Table 12: Part of Decision-making Process?

Participants who were involved in the decision-making process to select an ITRM framework were selected for interview. They were approached for an interview based on their response in the questionnaire feedback. Three staff members were interviewed from two different universities and were involved in ITRM at the respective universities. The key staff members responsible for ratifying the adopted framework were directors, senior managers and the relevant committees. Committees mentioned were audit committees, risk committees, senior IT management committees. The specific names have not been included here as it would reveal the identity of the relevant university. Anonymity was guaranteed when participation was requested for the questionnaire.

The participants were asked what the main reason was for selecting the frameworks and the responses varied across universities in Table 13.

Q18 - What is the main reason(s) for selecting the ITRM framework at your institution?
What is the main reason(s) for selecting the ITRM framework at your institu...
To comply with King III requirements/principles
due to a lack of formal framework and the high profile InfoSec is currently getting.
The intention for the adoption of an ITRM will be to ensure IT risk is dealt with in a holistic fashion, and to proactively have risk management frameworks in place to aid with potential regulatory requirements.
-
It alligns with the instatutional operational plan and deals thurrily with service delivery
formal process of assessing risks, classifying, responding
not aware
Visibility of risks, ability to manage, benchmark and report
UCT using cobit for governance and cobit risk dovetails with that, cobit known be most staff and management

Table 13: Main reasons for selecting ITRM Framework

The perceived benefits and challenges in Table 14 and Table 15 was a subjective response from the participants, as it was based on their experience and knowledge of the particular frameworks. While there were similarities in the responses, some were uncertain or some said there were none. The key benefits arising from the questionnaire was about managing your risks coherently, adhering to legislation and standards.

Q19 - In your opinion, what are the perceived benefits of the selected ITRM framework?
In your opinion, what are the perceived benefits of the selected ITRM frame...
Ensuring that the necessary controls and measures are in place for risk mitigation and adherence to IT best practice
i know far too little to make an informed statement.
ITRM aids with risk governance. Enables stakeholders to have a better understanding of IT risks encouraging them to contribute to the management of risk within their respective areas of influence.
A predefined structured approach that will lead to specific outcomes
Better service delivery
speak common language when dealing with risk - makes it easier to work with the auditors and University risk management committee
not aware
As above
Repeatability

Table 14: Perceived Benefits

The key challenges were addressing the lack of skills and knowledge of the framework amongst staff.

Q20 - In your opinion, what are the perceived challenges of the selected ITRM framework?

Q20 - In your opinion, what are the perceived challenges of the selected ITRM fra...

In your opinion, what are the perceived challenges of the selected ITRM fra...
It requires a top-down institutional adoption as well as culture and awareness
NIST is more suited to a country's critical infrastructure. Like all frameworks it will take some work to "beat" it into a shape that fits UCT (much like ITIL which didn't quite fittour service model either)
The challenges for any ITRM will be the applicability of the ITRM in the context of the University i.e. how will it fit in with current governance structures. The other challenge will be buy in by stakeholders, there may be resistance by some individuals as the implementation of an risk management system may expose weaknesses.
We have not specific framework that is the challenge. The perceived challenge of the current situation is that the team is coming up with their own approach, process etc which leaves it to scrutiny, comment, interpretation and varying levels of buy-in from all involved.
Staff addoption
none
not aware
It is generally perceived as an "added overhead" rather than adding value It is difficult to implement any framework without adequate dedicated resources
Not well known by management iutside icts

Table 15: Perceived Challenges

The ranking question identifies all the possible factors that could influence the decision-making process. It is also used to reference the prior conditions, characteristics of the decision-making unit and the perceived characteristics of the innovation (ITRM framework), using Roger's DOI. Participants were requested to rank twenty-two factors that could influence an individual's decision, in order of importance. This was based on their own opinion and there were no suggestions provided to the participants. The top five factors ranked by the participants has been presented in Table 16 to highlight the common factors between the participants. During the interviews, the factors were discussed further and are elaborated on in the next sections. This list was created, based on the factors appearing more than once in one of the top five rankings from each individual participant.

Attitude of decision makers towards IT Risk Management
Compatible with other standards and frameworks
Strong Corporate Governance
Integrated Risk Management strategy aligned with Business Strategy
Legal/Statutory Compliance
Adequacy of Risk Governance Structures
Support from Board
Regulatory Compliance
Strong Corporate Governance
Strong Leadership

Table 16: Top Ranking Factors influencing the decision-making process to adopt an ITRM

4.3 Interview Results

The researcher conducted initial data analysis of the questionnaire data and scheduled interviews based on the participant's preparedness to be interviewed. In addition to this, the researcher looked at their job function at the university in relation to IT risk management. In early August 2016, interview requests were sent to five participants from the questionnaire and only three responded to the meeting request. Follow up email reminders were sent for an interview however no further responses were received. The researcher concluded three interviews by the middle of August; two from University A and one from University C. Each interview was transcribed by early to mid-September. The transcribed interviews were later imported into Nvivo 11 where themes were derived from each. The respondents were namely Interviewee A, B and C and will be referred to as this from this point forth.

4.3.1. Data Analysis: Interview 1 – Interviewee A

Interviewee A and B responded almost immediately after the initial interview request and appointments were scheduled for the following week. The initial interview with Interviewee A was relatively quick and was completed within ten minutes at 15h00 in the afternoon. The researcher prepared probing questions in addition to the prepared questions based on the interviewee's responses from the questionnaire. This strategy was the basis of the other interviews and was done to ensure the researcher understood what the interviewee's responses were in the questions. The interview was recorded with the permission of the interviewee. Interviewee A was friendly and open to answering questions. This could be related to the fact that the researcher has a pre-existing professional relationship with the interviewee and therefore a level of trust existed. The interviewee felt free to

answer the questions without any influences. The interview was also conducted in a safe space, at the interviewee's office that could also have contributed to the ambience of the interview. As the interviewee had not been in the current job function for a number of years, the interviewee was not familiar with the history and was not able to elaborate on

When questioned on some of the questions raised in the questionnaire, the researcher attempted to eliminate any ambiguity in the feedback provided and to ascertain the motives. The researcher tried to understand why the particular framework was selected as opposed to another one. The interviewee however did not have all the historical information to provide an explanation. The interviewee did however state that the selection of COBIT and ITIL was "*probably the likely dominant and applicable framework and … during the implementation COBIT probably emerged as a contender*" (Interviewee A, personal communication, August 5, 2016) and therefore,*" probably simply picked the aspects of either that worked best for us"* (Interviewee A, personal communication, August 5, 2016).

Interviewee A (2016) also referred to one of the perceived challenges when selecting the framework as a "*grudge purpose*" and the researched wanted to explore this statement and fully understand what it meant. The interviewee elaborated on this by explaining that risk management itself is a *"kind of a grudge purchase".* They went on to state that "*it is simply a consequence that of adopting risk management as something that you take seriously and you know and it only really shows value when you can identify the fact that you have avoided or mitigated certain risks*" (Interviewee A, personal communication, August 5, 2016).

The ranking question was also further interrogated with the interviewee to understand why the factors influencing ITRM selection was ranked in the particular order of importance. The interviewee admitted that it was difficult to arrange the list in order of importance but emphasised the importance of buy in from top management as well as a strong governance.

There are no ITRM frameworks formally adopted at University A and therefore the remainder of the questions, relating to the implementation of the framework, were not valid in this interview.

4.3.2. Data Analysis: Interview 2 - Interviewee B

Interviewee B was also from University A and had a professional relationship with

the researcher. Therefore, the ambience of the interview was friendly and the interviewee appeared to be comfortable with the responses provided. The interviewee also provided valuable insights into other aspects of IT risk management at the respective university. The interviewee was also involved in the information security initiative and was therefore able to provide first-hand information.

The second interview was significantly longer than the first interview as the interview digressed a bit discussing information security at the university. Although this was not part of the interview scope, the discussion was pertinent in identifying the IT department's approach for managing IT risks. The interview lasted about thirty-five minutes but the interview recording was twenty-eight, forty-nine seconds minutes long as it only commenced when the research questions were probed. The recording started after the interviewee granted permission and the interview reverted to the purpose of the meeting. The researcher questioned why aspects of NIST and COBIT was selected instead of another framework. The interviewee indicated that the framework was selected on advice from an external audit firm and to comply with King III, COBIT principles, ISO27001 and South African legislation. There was however no investigation done to compare to other frameworks and then make an informed decision.

It was also unearthed that the framework was not adopted yet at the university. There were however plans to adopt it. The interviewee initially noted in the questionnaire that no prior knowledge of ITRM existed and they were unable to provide the benefits of adopting the said framework. The researcher reiterated the question, but rephrased it to enquire what the interviewee's personal opinion was. The response from Interviewee B (2016) was that COBIT and NIST were "*tried and tested on a much grander scale"* framework and based on the principles from each framework, it could work at a university. Interviewee B (2016) also noted that the *"bureaucracy of an organisation like this, does hamper attempts to roll out something like that and would actually be of great benefit to the university".*

Lastly, the researcher attempted to understand the justification for the response to the ranking question, where the factors were ranked in order of importance. Earlier during the interview, the interviewee had alluded to strong leadership and the adaptability of an ITRM framework as important factors for managing risks. Integrated risk management strategy aligned with business strategy and

compatibility with other frameworks and standards were deemed important factors for selecting a framework.

4.3.3. Data Analysis: Interview 3 – Interviewee C

The final interview was conducted a week later at University C with Interviewee C. The researcher had no professional relationship with this researcher and yet the interview was as relaxed as the previous interviews. The interviewee's friendly personality was open to share information and contributed to the ambience of the interview. The interviewee was very involved in ITRM at the university and was therefore the ideal participant for this research undertaking. The interviewee was rich with information and allowed the researcher to have deeper insight into ITRM efforts adopted thus far at University C. This interview lasted a full hour however, the sound recording is only seventeen minutes as the relevant interview questions only started towards the end of the hour. The first part of the interviewee, the interviewee provided background of the IT department's structure, the relevant IT committees and the interviewee's job function.

University C had initiated a project to implement an ITRM framework, namely COBIT. The university's senior management committee ratified this framework and therefore the project had the support from top management. This particular framework was selected mainly because the university needed to comply with King III report and it was best suited to their environment to address risks. Interviewee C (2016) also noted that this framework was a "*commonly used for one… and secondly, I think because internal, external audit is driven by COBIT. The controls that they come and verify and check for they use COBIT so, it's just a natural progression of, we almost have COBIT in the environment without knowing. Purely because of the controls that we are placing based on audit recommendation. Because the way they test the control, is what COBIT would prescribe for that particular control"*.

COBIT was not fully implemented yet because they discovered that there was a lack of knowledge and skills amongst all of the IT staff. They therefore had a few setbacks and had to go back to the drawing board to determine the best way forward by having workshops with all staff They also decided to obtain the services of an external audit company, one of the big five companies to assist them with the implementation and training. The university had to acknowledge that they were not capable of doing this on their own, as they did not have all the expertise. In the

meantime, the interviewee who was managing the project identified the principles in COBIT that they were already using and isolated the ones they still needed to tackle and implement. Another challenge they were faced with was human resources, who were able to assist the project management with various tasks. Some of the tasks were resolved by hiring temporary staff to complete the work.

When reviewing the top five selection of the ranking question, Interviewee C (2016) concurred that having a good corporate management and management support, are important factors, supporting the framework selection.

This university therefore had a formal process to review and identify a suitable framework and it took about a year to do this. The COBIT framework has been partially implemented.

4.4 Secondary Data Results

Secondary data was imported into Nvivo and coded as it was examined prior to importing it. All publicly available secondary data, such as IT policies, any risk related documentation or websites and annual reports were examined on each universities website. The sought after documentation relating to IT risk management were not available publicly and the information within the annual reports speaks broadly about risk management that includes IT. Therefore, all documents were examined carefully searching for ITRM or the adoption of a risk management framework.

4.4.1 Data analysis: Secondary Data

Numerous documents were reviewed from all four public universities and all were located on each university's public website. The researcher found many IT related documents as well institutional documents. There were however not any documents focused entirely on IT risks specifically nor risk management. The annual reports, which each university prepares for the Minister of Higher Education, has sections related to risk and IT risk management. This was quite useful as it provided the researcher with some insight into the risk profile of the university. Each university also needs to provide the Department of Higher Education and Training with a list of the critical risks and the controls in place to mitigate them. IT risks were also highlighted in some of the annual reports. Annual reports for the past three years, from 2013 to 2015, were reviewed and included as part of this analysis.

CHAPTER 5: RESEARCH FINDINGS

5.1 Chapter outline

This chapter encapsulates researcher's findings that was analysed in the previous chapter. These will be discussed with reference to the research questions and the conceptual framework.

5.2 Research Questions Findings

As indicated in the data analysis, the participation response rate in the questionnaire was very slow. The researcher assumed that the topic on ITRM framework adoption was not important to the participants but later on, it was evident that staff were not fully aware of ITRM initiatives at the university. The topic was therefore not something they could participate in to provide meaningful information. However, others may not have been interested in the topic or had the time to fill in the questionnaire.

The respondents also had experience in ITRM, as they were all IT staff. Although they did not have all the answers to some of the questions, the feedback was useful in this research as it highlighted the disparate views of ITRM at the university. This was evident mainly in University A, where there were more respondents to compare with.

The research questions and its objectives are discussed in relation to the data collected using the conceptual framework.

Research Questions	Objective
Primary	
What are the factors influencing the decision to adopt an Information Technology Risk Management framework within universities in South Africa?	The core objective is to determine which factors have an influence on the decision to adopt and ITRM framework.
Secondary	
Who are the relevant individual decision makers for ITRM framework adoption at a university?	The aim is to understand who are the people or groups of people who make the decisions to select and ITRM framework
What is the university's process to select an ITRM framework?	The aim is to identify if there is a formal process for selecting an ITRM framework and determine how it works
What are the internal factors which influence the individual's decision to adopt a specific ITRM framework or not at the university?	The aim is to determine which internal factors have an influence on the decision to adopt and ITRM framework.
What are the external factors which influence the individual's decision to adopt a specific ITRM framework or not at the university?	The aim is to determine which external factors have an influence on the decision to adopt and ITRM framework
What are the perceived benefits for the university when selecting a specific ITRM framework?	The aim is to determine what the benefits are when selecting an ITRM framework
What are the perceived challenges the university can anticipate when selecting a specific ITRM framework?	The aim is to determine what the challenges are when selecting an ITRM framework

Table 17: Research Questions

The primary question needs to be unpacked to understand the intricacies of how individuals make decisions, when selecting an ITRM framework. The secondary questions therefore provide one with a deeper insight, to address the primary research question. Each secondary question's findings will be discussed in the following sections, based on the data collected in the questionnaire, interview and secondary data. The literature relevant to the findings will be highlighted to provide further insight into the findings.

5.2.1 Who are the relevant individual decision makers for ITRM framework adoption at a university?

Based on the questionnaire and interview responses, the individual decision makers varied at University A. The documented responses from multiple participants were the risk committee, the senior IT committee, the ICT governance committee and the ICT committee. One participant was not aware of which committee was responsible for ratifying the framework, nor the staff members

involved. There were also varied responses when asked to identify the various individuals involved in contributing to the decision to select the framework.

This highlights the fact that staff within IT and others involved in risk management outside of IT, were not all aware of who the authoritative committee was to ratify the selected ITRM framework at University A. IT staff does not appear to have all the information related to ITRM as it is not known to all. It should therefore become more transparent within the IT department as all staff in IT are involved in some sort of risk management on a daily basis. All staff should know what framework is adopted, why it was adopted and should be trained on the framework, so they are able to implement the principles of the framework in their respective areas. This will also ensure that all staff are addressing risks uniformly across the IT department and ensure that everyone has a common understanding of all the facets of the framework.

There was only one response from University B, a senior director, who indicated that there were no committees responsible for the ratification of the ITRM framework. The IT senior management team were the individuals responsible for selecting the framework.

University C, who are more advanced with their ITRM framework initiative, indicated that the university risk committee was responsible for ratifying the framework, based on the recommendation from the ICT committees.

From University D, there was only one participant, a senior manager, who indicated that the senior IT management team were responsible for ratifying the ITRM adoption and the IT director was the individual responsible for making the decision to adopt a framework.

In summary, while IT staff at all of these universities, does not necessarily have the direct authority to approve the ITRM, they may influence the decision-making process, based on their recommendations. Therefore, it is best to assess what makes an individual select a framework and determine the factors influencing that decision. Collectively all individuals will make an informed decision based on all the factors influencing them.

Those individuals influencing the decision makers as well as the decision makers will need information regarding the framework to make an informed decision. The researcher therefore referenced the conceptual framework in Figure 6, to

understand the decision-making process to select the ITRM framework and adopt it. The framework itself is seen as an innovation as it is a new concept for the university to adopt. The process will be unpacked in the following Section, 5.2.2.

The decision-making committees were identified in literature as the audit and risk committee as they are responsible for overseeing the organisation's risks (Hoyt & Liebenberg, 2011; Paape & Speklè, 2012). Therefore the IT governance committee should report to the audit and risk committee with the proposed framework, where it will be approved for implementation (Debreceny, 2013). The IT governance committee should comprise of the relevant IT staff responsible for the various risks (Faber & Faber, 2010) who will recommend the framework to be ratified.

It is therefore noted that University A and C have adequate governance structures in place to ensure that the framework can be ratified at the appropriate committee level. University C already has already surpassed the ratification stage and is now at the implementation stage of the framework, COBIT. Although University C has one recorded participant, the information provided is from a trusted and reliable source who is managing the ITRM implementation project and is involved in IT risk management. The information was also further interrogated during an interview with the same participant. University A has recommended a framework, which is an adaptation of NIST, but still needs ratification from the audit and risk committee. University B and D is inconclusive based on the limited response for each university and therefore the researcher cannot make assumptions as there was only one response from each university in the questionnaire. There were also no further interviews with these participants from University B and D.

5.2.2 What is the university's process to select an ITRM framework?

University C was the only university identified, who had a formal process in place to adopt an ITRM framework. The selected framework was selected because it was a commonly used framework and was easily identifiable and adaptable to the university environment. Many of the existing principles of COBIT had already been a part of the IT department's function and now needed to be included as part of the COBIT framework. Risks are reported to the Audit and risk committee in a language that is common to all and therefore understood clearly.

University A had no formal process to adopt an ITRM framework. There was however, an initiative to implement an information security framework, which in

itself is a framework, addressing a majority of IT risks. The framework was selected based on the recommendations from an external audit company, a big four company. The framework selected was NIST. As there was no formal process, many staff at University A was not aware of any ITRM framework that was adopted and those who knew of a framework was not sure which one was selected. A lack of transparency of the ITRM framework and a dearth of knowledge and skills causes ambiguity amongst staff with regard to understanding. Risks are therefore not managed uniformly. Risks are reported to the audit and risk committee and understood by the committee however the risks should be managed more coherently by all IT staff. Risks are managed by each department in various ways and according to perceived needs and where understood, to comply with statutory and regulatory requirements.

University B indicated that a formal process existed at the university to select an ITRM framework however; there was no further interview with the participant, to engage more on this process. The participant opted not to be a part of the interview stage of this research. The adopted framework, as indicated by this participant, was COBIT. The participant is a part of the senior IT management team and is therefore a reliable source to confirm the adoption of the COBIT framework. The process took up to one year to adopt a framework at the university. The actual timeframe was not confirmed, as there was no follow up interview. This was selected mainly to ensure everyone in IT understood the framework and could relate to it. A common understanding of the terminology made it easier liaising with auditors and the risk committee.

The participant from University D identified the ITIL framework as the adopted ITRM framework and confirmed there was a formal process to select a framework. The participant was however not a part of the decision-making and the researcher was unable to verify what the process entailed as a follow up interview was not done. Although the researcher attempted to interview University D and B participants, no interview was confirmed after two requests.

Between universities A, B and D, the researcher was not able to conclusively identify the process undertaken to select the framework and was not fully able to understand all the prior conditions, characteristics of the decision-making unit and the perceived characteristics of the innovation; the ITRM framework.

What is known is that external auditors, from the big four company, provided a

recommendation. The university decided on a framework to adopt and implement based on recommendations, while considering various factors. Some of the factors influencing that decision are identified in the following Sections 5.2.3 and 5.2.4.

Section 5.3 will explore the conceptual framework in detail and identify any gaps based on the data collected.

5.2.3 What are the internal factors which influence the individual's decision to adopt a specific ITRM framework or not at the university?

The themes identified in the research has been included in the Table 17 and is discussed further in this chapter. The themes highlighted in dark blue are the variables used for the conceptual framework in Chapter 2, Section 2.6.

Name	Sources	References
External Factors		
Adaptability	2	2
External Party	2	2
Legislation & Statutory	6	6
Popularity	4	5
Regulatory	3	5
Internal Factors		
Attitude of decision makers towards IT Risk Management	1	4
Financial	3	3
Manage Risks	1	3
No formal framework	1	1
No reason	1	2
Support Internal Policies	1	1
Top down approach	1	2
Strong Corporate Governance	1	3
IT Governance	3	3
Strong Leadership	1	1
Unaware	1	1
University strategy	1	1
Strategic alignment	4	6
Perceived Benefits		
Benchmarking and Reporting	1	1
Common Framework	3	4
Improved Service Delivery	1	1
Manage Risks	1	3
Repeatability	1	1
Unknown	1	1
Visibility of Risks	1	1
Perceived Challenges		
Adaptability	1	1
Developing various framework	1	1
Institutional Culture	1	2
Lack of knowledge and skills	1	3
No top down approach	1	1

Overhead	2	2
Staff adoption	1	1
Unknown outside of ICTS	1	1
Value of Framework	1	1
Risk Management Experience	1	10
Risk Management Implementation	8	12
Enterprise wide risk management	1	1
IT Risk Management Implementation or Adoption	2	3

Table 18: Emerging Themes

All the data collected and presented and relevant to the conceptual framework, will assist in answering the research questions. Although the data collected across universities is limited, the data is representative of each university based on the participants' knowledge.

The internal factors from Table 17, which emerged from the themes, strongly emphasized that the attitude of the decision makers towards risk management, was very important for adopting a framework. For a successful framework implementation at the university, there needs to be a positive attitude from management to adopt the framework and fully invest in the implementation of the framework (Amalina et al., 2012; Beasley et al., 2005; Fadun, 2009; Hudin & Hamid, 2014; Paape & Speklè, 2012; Zhao et al., 2013).

Following the attitude of management, a strong corporate governance was crucial to the adoption of the framework. With strong leadership, attitude of decision makers and governance in top management of the university (Bichsel & Feehan, 2014) as well as in the IT department, the adoption of the framework can evolve fairly seamlessly .

The framework should also support the university's policies and be able to align with the business' overall strategy (Fadun, 2009; Zhao et al., 2013). Alignment emerged as a strong factor when deciding on a framework as IT risks cannot be managed in isolation from the business risks. IT is prevalent in all departments across the university and should map with the business strategy.

There is also a financial factor that influenced the adoption due to financial and legal regulations. ITRM is crucial to the overall wellbeing of the university as it is responsible for all the core administrative systems that manage the university's finance, human resources and student affairs. Therefore, adhering to financial compliancy is inevitable and has a huge impact on IT risk management (Amalina et

al., 2012; Lundquist, 2011). IT infrastructure and systems are used to manage the finances of the university and therefore risks must be managed effectively.

The ability to manage IT risks was also a leading factor influencing the decision to adopt a framework. Where there was a formal framework, it was indicated that the ability to manage risks coherently, was one of the main reasons for selecting a particular framework. The frameworks used by the universities were all capable of managing risks, so a more compelling reason was warranted. Even where no framework existed, any framework should not be selected either. Frameworks should be reviewed and a suitable one should be selected for the framework. There is no specific framework found that has been designed specifically for higher education in South Africa, therefore universities in South Africa must select one that can adapt to the university's environment (Amalina et al., 2012; Waters, 2008; Wessels & Van Loggerenberg, 2006).

When reflecting on these internal factors, all of these were evident in the literature as depicted in Table 2. The internal factors used in the conceptual framework, were tested and the resulting factors have been indicated in Section 5.3. The factors that emerged were all revealed during the literature review and the researcher corroborated the important factors at a university. It was however not possible to generalise for all universities as the data collected was not widely spread amongst the universities. This could be analysed further by doing case studies with the various universities and doing an in-depth analysis.

5.2.4 What are the external factors which influence the individual's decision to adopt a specific ITRM framework or not at the university?

The external factors which emerged from the collected data were adaptability, external party, legislation, statutory, popularity and regulatory. The most prominent external factors, which are not internal to the university environment and influenced the decision-making were mainly due to legislation and statutory requirements. The HEA mandates universities to manage all risks across the institution, inclusive of IT risks. Regulatory requirements and the popularity of the framework featured as an important factor affecting the decision-making process. The adherence to regulatory requirements was found to be a major influence when adopting an ITRM (Amalina et al., 2012; Kanhai & Ganesh, 2014; Paape & Speklè, 2012) in an organisation. Lundquist (2011) also indicated the importance of regulatory requirements for higher education in South Africa.

The popularity of a framework also stood out as an important factor as the decision makers, will refer to other universities already using it and rely on testimonials of existing users of the framework. This factor was not covered in the earlier literature but emerged from the qualitative data collection. Adopters of a framework feel more at ease for selecting the framework as it has been tried and tested before (Interviewee C, personal communication, August 17, 2016).

The last two factors, adaptability and external party, appeared during the data collection but was not as prominent amongst all the participants. Participants indicated that the selected framework will not be used in its entirety at their respective university and should be adaptable to their environment. The adaptability of the framework to blend into the university's environment is strongly endorsed (Bichsel & Feehan, 2014).

External party, referred to other people or organisations who had a direct or indirect influence on the decision-making influence on the selected framework. At University A and C, the same big four company, made recommendations for the framework and the university made the necessary decisions to adopt the framework. The universities relied on the company's expertise and advice, as they were involved in ITRM frameworks at different types of organisations and had the skills to assist with the implementation thereof. The literature also indicates that the presence of a big four company has an influence on the selection of the framework (Amalina et al., 2012; Beasley et al., 2005; Hudin & Hamid, 2014).

5.2.5 What are the perceived benefits for the university when selecting a specific ITRM framework?

From the data collected during the interviews and questionnaires, some benefits of selecting a framework were highlighted in Table 14. This was only useful if the participants knew which framework was adopted by their university. If there were not certain of the framework, the benefits were more generalised and not linked to the adoption of a particular ITRM framework. In some cases, the participants did not know which framework was adopted at the relevant university.

The responses included in Table 14 highlighted the main benefit for selecting a framework was to ensure that risks are managed and controlled effectively (Bichsel & Feehan, 2014; Paape & Speklè, 2012). Some of the responses in the questionnaire attested to this benefit, by stating that *"ITRM aids with risk governance. Enables stakeholders to have a better understanding of IT risks*

encouraging them to contribute to the management of risk within their respective areas of influence" (Respondent A, personal communication, April 24, 2016) and "*Ensuring the necessary controls and measures are in place for risk mitigation and adherences to IT best practice"* (Respondent B, personal communication, June 13, 2016).

Staff are also able to understand the overall risks clearly within the IT department with the use of benchmarking and reporting (Bhattacharjya & Chang, 2006). This has found to be valuable to the participants as it made the risks more visible in an easy to understand language. Staff also had a common understanding of the framework and they could relate to the principles and practices. A response in the questionnaire stated, *"speak common language when dealing with risk – makes it easier to work with the auditors and University risk management committee."* (Respondent C, personal communication, May 17, 2016). Risks are also more transparent to all staff when it is added to a risk register, as required by best practices (Babb et al., 2013). Reporting to the audit and risk committees are easier as the register is updated timeously.

The benefits could not be corroborated, as there were no measurement statistics available for those who had implemented a framework. The only way of measuring the benefits, was to rely on the feedback from the participants. The responses were therefore mainly subjective to their participant's own experience in dealing with IT risks.

While managing the risks and mitigating them, service delivery may also be improved, depending on the risk. This is true when risks have influenced the service to customers. By putting controls in place, service delivery is improved.

The perceived benefits mainly contributed to a successful risk management framework ensuring all risks are managed in a controlled manner (Paape & Speklè, 2012).

5.2.6 What are the perceived challenges the university can anticipate when selecting a specific ITRM framework?

The perceived challenges, which came across quite strongly in the data, was institutional culture and lack of knowledge and skills. Institutional culture is strongly aligned with the lack of knowledge and skills as the university member's decisions are influenced by their knowledge. It is therefore imperative for the culture in the

university to be educated on the selected frameworks to ensure that informed decisions are made.

Another challenge is the inability of a framework to adapt to the university environment. It is therefore necessary for senior staff to research whether or not the framework can or has been used in a university and if they have been, what the outcomes were. Before investing in the framework, the necessary leg work has to be done.

Some participants dreaded that their colleagues were using their own variations of frameworks to manage risks within their teams and there was no coherent framework.

While having buy-in from the top down was a benefit, it was also a challenge where there was no buy-in from the top. Another participant felt that adopting a framework could be seen as a "*grudge purpose*" as it is something that has to be done to comply with the law and regulatory bodies (Interviewee B, personal communication, August 4, 2016). Besides it being a "*grudge purchase*", the framework itself could also offer no value to the university, which is an added challenge for the university. To reiterate, the necessary leg work must be done before deciding on a framework. It must offer value to the university in all aspects of risk management.

5.3 Conceptual Framework Findings

When referring back to the definition of diffusion defined by Rogers (2003, p.5), "*process in which an innovation is communicated in certain channels over time among the members of a social system*" and innovation is "*an idea, practice or project that is perceived as new by an individual or other unit of adoption"*. In this research, the innovation is the ITRM framework. In the early stages of the decision-making process, recommendations are made to a committee or individuals to adopt an ITRM framework. There is then a phased approach for those individuals, to make an informed decision, taking into account a myriad of factors.

When observing the conceptual framework in Figure 8, a combination of internal and external factors influences the decision-making process to select and adopt an ITRM framework. The decision-making process framework has been adapted to depict only the factors influencing the selection process for the framework based on the data collected, using Rogers' DOI theory.

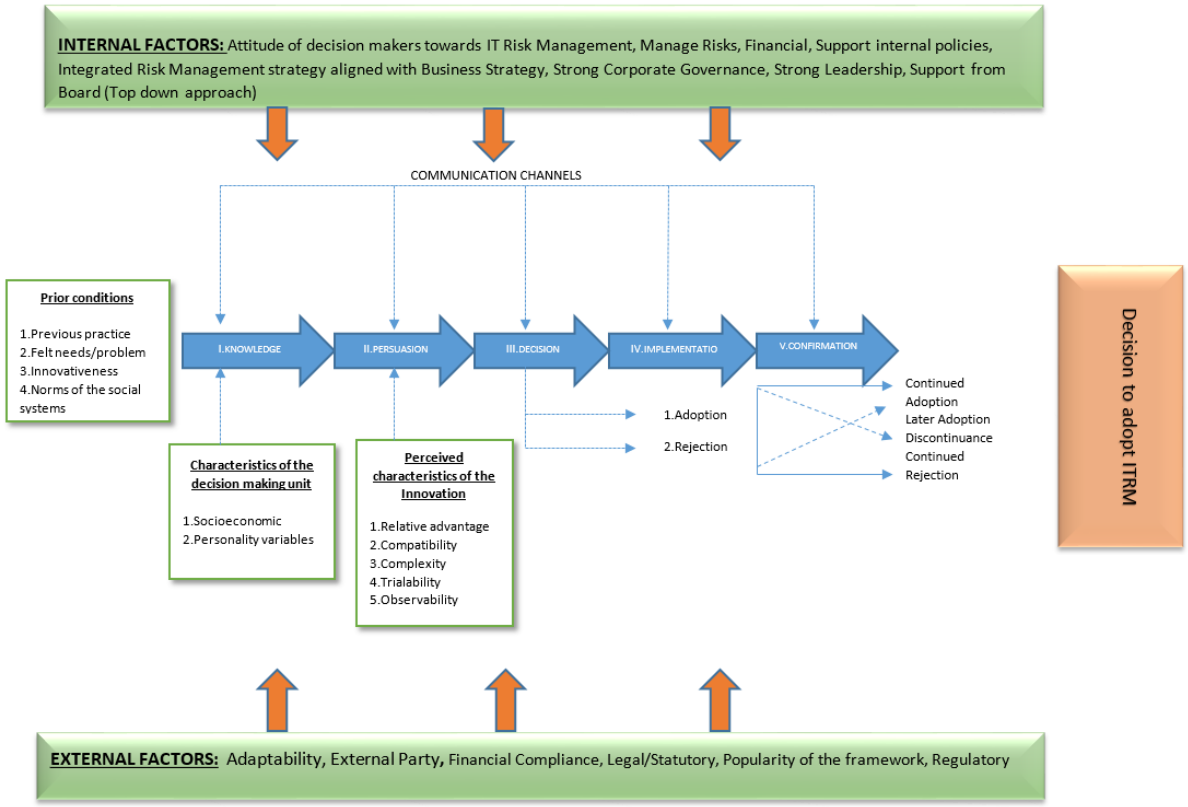


Figure 8: Decision-making Process for ITRM Framework Adoption

During this decision-making process, individuals receive information about the framework, adding to their knowledge about the innovation. They process this knowledge by looking at the perceived benefits, challenges and how it would fit into the university. Often contrasts are made with other frameworks to ensure the most suitable one was selected. In the case of all of the universities, there was no apparent comparison of frameworks and was selected mainly because of recommendations from others. This was noted for University A and C. There was also no visible mechanism to identify if the framework would be suitable to a university in South Africa. In University A's case, the university was contrasted to a small town by Interviewee B (2016). Comparisons were then made with the selected framework, NIST, and how it works for towns. The *complexity* of the ITRM framework was not a factor identified in the research however, this would be considered when looking at how the framework fits into the university. This is an assumption made by the researcher, as it was not evident in the data collected. The *Trialability* of the framework was evident in University C as they had implemented the framework but realised they did not fully understand the requirements and had to start over. The rest of the universities did not have this in place as there was no apparent process.

Rogers (2003) mentioned that similar individual's education, social status and

innovativeness would potentially influence the adoption process. In the case of the universities, all the relevant decision makers had similar experiences with ITRM and therefore shared a common goal, to manage the risks effectively and select a recommended framework.

Finally, a decision is made to either adopt the framework or reject it by reflecting on the four key elements of Rogers' (2003) theory; *Innovation, Communication channels, Time and Social System*. These elements guarantee that all the individuals are provided with clear and sufficient information about the framework to ensure they select a suitable framework for their environment. They require sufficient time to process the information before a decision can be made. University C was the only identified university who had a formal process implemented for ITRM specifically.

Once the individuals have a complete understanding of the framework, a decision will be made to adopt or reject. If it is adopted, the framework is implemented and staff are informed and trained to ensure a smooth implementation process. If it is rejected, the entire process is abandoned and a new alternative framework is reviewed.

CHAPTER 6: CONCLUSION

The key findings presented in the previous section substantiates the problem statement noted by the researcher. Various ITRM frameworks are adopted at the universities, confirming the inconsistent adoption of varying frameworks, including NIST, ITIL and COBIT. These frameworks are accepted as industry standard (Bichsel & Feehan, 2014). In an attempt to comprehend the inconsistencies, the research findings provide a clearer depiction of the current situation at universities in South Africa.

The decision-making process to adopt an ITRM framework is influenced by a myriad of internal and external factors. The internal factors were the attitude of decision makers towards ITRM, manage risks, financial, support internal policies, integrated risk management strategy aligned with business strategy, strong corporate governance, strong leadership and support from the board. The external factors were the frameworks adaptability, external party influences, financial compliance, legal compliance, popularity of the framework and regulatory compliance. The subsequent framework, *Decision-making Process for ITRM Framework Adoption,* was developed for universities in South Africa using Roger's Diffusion of Innovation theory (2003). This theory's decision-making process was used as a lens to understand the data collected by this research and thus inform the findings.

There is no established decision-making process at most of the universities, which was consistent among the participating universities. This is attributed mainly to the lack of corroborating data from all the universities to make a generalised statement. For some of the universities which adopted an ITRM framework, the decision-making process was not evident to the researcher based on the findings. One university had a defined process to adopt and implement the adopted framework.

The adopted frameworks at each of the universities presented challenges and benefits for each university. Based on the research data collected, there does not appear to be a great need to have an ITRM framework, specifically for universities in South Africa, as the current framework was suitable. This however would require further research. Each university has adopted a framework that has been adapted to their environment while ensuring that IT risks are controlled and managed. There are no measurements available to attest to the framework's efficiency and

therefore no conclusions can be made in this regard.

Although universities generally function in the same manner, the internal and external factors may vary at each institution. Further case studies may need to be done at specific universities to gain a deeper insight into the decision-making process for ITRM adoption.

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8. APPENDICES

8.1 Faculty of Commerce Ethics Application Approval

UNIVERSITY OF CAPE TOWN

FACULTY OF COMMERCE

Igniting Knowledge and Opportunity

Commerce Faculty Ethics in Research Application Form

Any person planning to undertake research in the Faculty of Commerce at the University of Cape Town is required to complete this form **before collecting or analysing data**. If any of the questions below have been answered YES, and the applicant is NOT an Honours student, the form it should be submitted to the supervisor (where applicable) and from there for approval by the Faculty EIR committee: Ms Samantha Alexander (**samantha.alexander@uct.ac.za).**

It is assumed that the researcher has read the UCT Code for Research involving Human Subjects (Available at http://web.uct.ac.za/depts/educate/download/uctcodeforresearchinvolvinghumansubjects.pdf) in order to be able to answer the questions in this form.

Students must include a copy of the completed form with the dissertation/thesis when it is submitted for examination.

1. PROJECT DETAILS		
Project title: Factors influencing the decision to adopt an Information Technology Risk Management framework at universities in South Africa		
Principal Researcher/s: Tina Seale	**Email address(es):**	Chrtin004@myuct.ac.za
Research Supervisor: Michael Pollock	**Email address(es):**	Michael.pollock@uct.ac.za
Co-researcher(s): N/A	**Email address(es):**	**N/A**
Department: Department of Information Systems		

Brief description of the project

This research undertaking focuses on Information Technology Risk Management (ITRM) at universities in South Africa. The researcher aims to explore the factors influencing the adoption of a specific ITRM framework at universities by using Rogers' (2003) Diffusion of Innovation (DOI) theory as a lens to comprehend the decision making process. The research questions have been divided into primary and secondary questions:

Primary Question:

- What are the factors influencing the decision to adopt an Information Technology Risk Management framework within universities in South Africa?

Secondary Questions

- Who are the relevant individual decision makers for ITRM framework adoption at a university?
- What is the university's process to select an ITRM framework?
- What are the internal factors which influence the individual's decision to adopt a specific ITRM framework or not at the university?
- What are the external factors which influence the individual's decision to adopt a specific ITRM framework or not at the university?
- What are the perceived benefits for the university when selecting a specific ITRM framework?

- What are the perceived challenges the university can anticipate when selecting a specific ITRM framework?

Data collection: (please select)

☒ Interviews ☒ Questionnaire ☐ Experiment ☐ Secondary data ☐ Observation

☐ Other (please specify): _____

Have you attached a research proposal OR a literature review with research methodology? (please select) ☒ Yes ☐ No

2. PARTICIPANTS

2.1 Does the research discriminate against participation by individuals, or differentiate between participants, on the grounds of gender, race or ethnic group, age range, religion, income, handicap, illness or any similar classification?	YES	**NO**
2.2 Does the research require the participation of socially or physically vulnerable people (children, aged, disabled, etc.) or legally restricted groups?	YES	**NO**
2.3 Will you be able to secure the informed consent of all participants in the research? (In the case of children, will you be able to obtain the consent of their guardians or parents?)	**YES**	NO
2.4 Will any confidential data be collected or will identifiable records of individuals be kept?	YES	**NO**
2.5 In reporting on this research is there any possibility that you will not be able to keep the identities of the individuals involved anonymous?	YES	**NO**
2.6 Are there any foreseeable risks of physical, psychological or social harm to participants that might occur in the course of the research?	YES	**NO**
2.7 Does the research include making payments or giving gifts to any participants?	YES	**NO**

If you have answered **YES to any of these questions**, please describe how you plan to address these issues (append to form):

Affiliations of participants: (please select)

☒ Company employees ☐ Hospital employees ☐ General public ☐ Military staff ☐ Farm workers
Students

☐ Other (please specify):

Race / Ethnicity:
Are you asking a question about race/ethics in your questionnaire?

☐ Yes ☒ No

Which race categories have been used?

Have you included the option: "Prefer not to answer" as part of your race/ethics question? N/A

3. PROVISION OF SERVICES

Does your research involve the participation of or provision of services to communities?
NO
If your answer is YES, please complete below:

3.1 Is the community expected to make decisions for, during or based on the research?	YES	NO
3.2 At the end of the research will any economic or social process be terminated or left unsupported, or equipment or facilities used in the research be recovered from the participants or community?	YES	NO
3.3 Will any service be provided at a level below the generally accepted standards?	YES	NO

If you answered YES to any of these questions, please describe below how you plan to address these issues.

3. ORGANISATIONAL PERMISSION

If your research is being conducted within a specific organisation, please state how organisational permission has been/will be obtained:

The research will be conducted at four public universities in the Western Cape, South Africa. Once ethics approval is obtained from UCT, the researcher needs to request ethics clearance from each of the universities in the Western Cape i.e. Cape Peninsula University of Technology, University of the Western Cape, University of Stellenbosch and University of Cape Town. The researcher has done the necessary research to confirm the process for ethics approval for external researchers and all of the above institutions require the Research Design with UCT's formal ethics approval for the research to be conducted.

Have you attached the letter from the organisation granting permission? (please select)

☐ Yes ☒ No, but this **will be** obtained before commencing the research ☐ Not applicable

Are you making use **of UCT students** as respondents for your research? (please select) ☐ Yes ☒ No

If yes, have you contacted Executive Director: Student Affairs for permission? (please select) ☐ Yes ☐ No

Was approval granted? (please select) ☐ Yes ☐ No ☐ Awaiting a response

Are you making use of UCT staff as respondents for your research? (please select) ☒ Yes ☐ No

If yes, have you contacted Executive Director: Human Resources for permission? (please select) ☒ Yes ☐ No

Was approval granted? (please select) ☐ Yes ☐ No ☒ Awaiting a response/ ***Pending Ethics approval before requesting permission with Exec Director of HR (requirement on HR form)***

Contact Emails: Executive Director: Human Resources (Miriam.Hoosain@uct.ac.za)
Executive Director: Student Affairs (Moonira.Khan@uct.ac.za)

4. INFORMED CONSENT

What type of consent will be obtained from study participants?

- ○ Oral Consent
- ⊗ ***Written Consent***
- ⊗ ***Anonymous survey questionnaire*** (covering letter required, no consent form needed)
- ○ Other (please specify)

How and where will consent/permission be recorded?

Consent forms will be sent to interviewee participants when they are requested to be participants. The signed forms/written consent will be saved by the researcher in Google Drive to ensure its safekeeping.

Have you attached an informed consent form to your application? ☒ Yes ☐ No

5. SPONSORSHIP OF RESEARCH

If your research is sponsored, is there any potential for conflicts of interest? NO
If your answer is YES, please complete below

4.1 Is there any existing or potential conflict of interest between a research sponsor, academic supervisor, other researchers or participants?	YES	NO
4.2 Will information that reveals the identity of participants be supplied to a research sponsor, other than with the permission of the individuals?	YES	NO
4.3 Does the proposed research potentially conflict with the research of any other individual or group within the University?	YES	NO

If you have answered **YES** to any of these questions, please describe how you plan to address these issues (append to form)

6. RISK TO PARTICIPANTS

Does the proposed research pose any physical, psychological, social, legal, economic, or other risks to study participants you can foresee, both immediate and long range? (please select)

☐ Yes ☒ No

If yes, answer the following questions:

1. Describe in detail the nature and extent of the risk and provide the rationale for the necessity of such risks
2. Outline any alternative approaches that were or will be considered and why alternatives may not be feasible in the study
3. Outline whether and why you feel that the value of information to be gained outweighs the risks

1. N/A

2. N/A
3. N/A

I certify that I have read the Commerce Faculty Ethics in Research policy) ☒ **(**http://www.commerce.uct.ac.za/Pages/ComFac-Downloads

I hereby undertake to carry out my research in such a way that

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

Signed by:

	Full name and signature	Date
Principal Researcher/Student:	**Tina Seale** Signed	16 November 2015

This application is approved by:

Supervisor	**Michael Pollock** Signed	16 November 2015
HOD (or delegated nominee – for all Honours Projects):		
Chair: Faculty EIR Committee (only for postgraduate research at Master and PhD level)	Signed Approval to access staff at the other institutions has to be attained by the researcher prior to the interviews. The approval must be sent to the Commerce EiRC committee for record. 8 December 2015	

CHECKLIST	SELECT
A full copy of a research proposal or a literature review with methodology is attached in a separate file	☒
Interview schedules / cover letters / questionnaires / forms and other materials used in the study are attached in separate files	☒

Organisational consent letter / UCT student or staff approval letter ***(HR requires ethics approval first)***	☐
On your cover letter to your questionnaire have you included the following? **1. The following UCT Logo**  **2. A sentence explaining the aim of the research** **3. Sentences of a similar nature to below must be included in the cover letter or consent form:** **This research has been approved by the Commerce Faculty Ethics in Research Committee.** **Your participation in this research is voluntary. You can choose to withdraw from the research at any time.** **The questionnaire will take approximately X minutes to complete** **You will not be requested to supply any identifiable information, ensuring anonymity of your responses.** **Due to the nature of the study you will need to provide the researchers with some form of identifiable information however, all responses will be confidential and used for the purposes of this research only.** **Should you have any questions regarding the research please feel free to contact the researcher (insert contact details).** **4. Have you scanned in your signature for the last section of the form?**	☒ ☒ ☒ ☒ ☒ **OR** ☐ ☒ ☒

Faculty of Commerce

Private Bag X3, Rondebosch, 7701
2.26 Leslie Commerce Building, Upper Campus
Tel: +27 (0) 21 650 4375/ 5748 Fax: +27 (0) 21 650 4369
E-mail: com-faculty@uct.ac.za
Internet: www.uct.ac.za
@Commerce_UCT **UCT Commerce Faculty Office**

11 February 2016 Ref:2311201502

Mrs Tina Seale

Project title: Factors influencing the decision to adopt an Information Technology Risk Management framework at universities in South Africa

Dear Researcher,

This letter serves to confirm that this project as described in your submitted protocol has been approved. You will need to obtain permission from the Executive Director: Human Resources before commencing data collection.

Please note that if you make any substantial change in your research procedure that could affect the experiences of the participants, you must submit a revised protocol to the Committee for approval.

Kind Regards

Prof Ulrike Rivett
Chair Ethics, Faculty of Commerce

8.2 Application - Access to University A Staff for Research Purposes Form

[redacted]

NOTES

- [redacted]

SECTION A: APPLICANT DETAILS

Title	Mrs	Name	Tina
Telephone number	0732898644	Email address	tina.seale@uct.ac.za or chrtin004@myuct.ac.za
Student number	CHRTIN004	Staff number	01404663
Visiting researcher ID / passport number	N/A		
Faculty Officer contact details			
University or institution at which employed or a registered student	UCT		
Faculty or department in which you are registered or work	Information Systems, Commerce (where I am a student) ICTS (where I work)		
Address (if not UCT)			

SECTION B: SUPERVISOR DETAILS

	Title and name	Telephone number	Email address
Supervisor	Mr Michael Pollock	021- 650 4693	michael.pollock@uct.ac.za
Co-Supervisor			

SECTION C: APPLICANT'S FIELD OF STUDY (if applicable) / TITLE OF RESEARCH PROJECT / STUDY

Degree	MCom IS		
Research project or title	Factors influencing the decision to adopt an Information Technology Risk management framework at universities in South Africa		
Research proposal attached	☒ Yes	☐ No	
Target population (number of UCT staff)	+-10		
Amount of time required for an interview and/or questionnaire	+-15 minutes		
Lead Researcher details	Mrs Tina Seale		
Proof of ethical clearance status attached	☒ Yes	☐ No	

SECTION D: FOR OFFICE USE (Approval status to be completed by the Executive Director, Human Resources or Nominee)

Support or approval			Role	Signature	Date
Supported?	☑ Yes	☐ No	[redacted]		17/2/16
Approved?	☑ Yes	☐ No			17/2/16

8.3 Ethics Approval from University C

[redacted]

Office of the Chairperson Research Ethics Committee	Faculty: **BUSINESS**

At a meeting of the Research Ethics Committee on 18 May 2016, **Ethics Approval**

was granted to TINA SEALE **for research activities Related to a research project**

at the Cape Peninsula University of Technology

Title of dissertation/thesis:	Factors influencing the decision to adopt an Information Technology Risk Management framework at universities in South Africa Research Supervisor: Michael Pollock

Comments:

Decision: APPROVED

[redacted]	**18 May 2016** **Date**

8.4 Ethics Approval from University C

17 June 2016

Ms Tina Seale
Faculty of Business and Management Sciences
CPUT
Cape Town

Dear Ms Seale,

RE: PERMISSION TO CONDUCT RESEARCH AT [redacted]

The Faculty Research Ethics Committee received your application entitled "Factors influencing the decision to adopt an Information Technology Risk Management framework at universities in South Africa", together with the dossier of supporting documents.

Permission is herewith granted for you to do research at the Cape Peninsula University of Technology.

Wishing you the best in your study.

Sincerely

8.5 Ethics Approval from University D

From: Registrar [mailto: registrar@**xxx**.ac.za]
Sent: 04 February 2016 02:41 PM
To: Tina Seale <tina.seale@uct.ac.za>
Subject: RE: Ethical Clearance Request - External researcher from UCT

Hi
Yes, that's fine as long as it's voluntary and only to those you know.

Regards

xxxxxx
Registrar
xxxxxx

>>> Tina Seale <tina.seale@uct.ac.za> 2016/02/03 08:14 PM >>>
Good day

I would like to enquire if the research could possibly go ahead with the existing contacts I have at your institution? I am currently a staff member at UCT as well as a student and I have formed professional relationships with staff at your institution within the relevant department. I will therefore not require any contact details from staff that I do not know. I will request the contact person to distribute the questionnaire to relevant staff only.

I would appreciate if you reconsider based on the information above.

Regards
Tina

From: Registrar [mailto:registrar@xxx.ac.za]
Sent: 02 February 2016 08:50 AM
To: Tina Seale <tina.seale@uct.ac.za>
Subject: Re: Ethical Clearance Request - External researcher from UCT

Dear Ms Seale
We do not automatically grant permission to external students to conduct research using our students/staff as participants at **XXX**. You need to apply for permission to do so.

However, since you are not registered at **XXX** or do not have a co-supervisor here we are not in a position to allow you to use our staff as participants. In response to legislation we do not provide contact details of staff or students to a third party. Further, we are inundated with requests such as yours and have taken a principled decision to only allow students who are registered with us or who may have a co-supervisor at **XXX** to request staff/students to participate in research.

Yours sincerely

Registrar
XXXX

>>> Tina Seale <tina.seale@uct.ac.za> 2016/02/01 04:11 PM >>>
Good day

Please find attached my ethics clearance document from UCT as I am requesting additional clearance from your institution to collect data from staff.
My research would involve collecting data from your institution's staff who are involved in Information Technology risk management.
Data will be collected during Q1 – Q2 of this year.

Please let me know if you require any additional information.

Regards
Tina Seale

8.6 Ethics Approval from University B

[redacted]

8 February 2016

Ms Tina Seale
Department of Information Systems
University of Cape Town
Cape Town

Dear Ms Seale

Concerning research project: *Factors influencing the decision to adopt an IT Risk Management Framework at Universities in South Africa*

The researcher has institutional permission to proceed with this project as stipulated in the institutional permission application. This permission is granted on the following conditions:

- The researcher must obtain ethical clearance before commencing with this study.
- Participation is voluntary.
- Persons may not be coerced into participation.
- Persons who choose to participate must be informed of the purpose of the research, all the aspects of their participation, the risks to participation, their role in the research and their rights as participants. Participants must consent to participation. The researcher may not proceed until she is confident that all the before mentioned has been established and recorded.
- Persons who choose not to participate may not be penalized as a result of non-participation.
- Participants may withdraw their participation at any time, and without consequence.
- The data must be responsibly and suitably protected.
- The researcher must pay due diligence in seeing that the data is handled in the strictest confidence.
- Data must be collected and processed in a way that ensures the anonymity of all participants.
- The use of the collected data may not be extended beyond the purpose of this study.
- Individuals may not be identified in the report(s) or publication(s) of the results of the study.
- The privacy of individuals must be respected and protected.
- The researcher must conduct her research within the provisions of the Protection of Personal Information Act, 2013.

Best wishes,

[redacted]

8.7 Cover Letter – Questionnaire

Department of Information Systems
Leslie Commerce Building
Engineering Mall, Upper Campus
OR
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21650 2280
Internet: http://www.commerce.uct.ac.za/informationsystems/

Dear Sir/Madam

I am a part time MCom Information Systems student at the University of Cape Town (UCT), conducting research on the factors influencing the decision to adopt an Information Technology Risk Management framework at a university in South Africa.

This research has been approved by the Commerce Faculty Ethics in Research Committee. You have been selected as a participant of this research questionnaire given your role in IT risk management and/or Enterprise wide risk management experience. Your participation will be highly appreciated. The questionnaire will take approximately **10-15** minutes to complete and there are **19** questions. The questionnaire can be viewed at the following link: http://bit.ly/1RYz1MO

Please note the following:

- Participation is voluntary;
- Participants will remain anonymous and all data obtained will be kept confidential.
- You may refrain from participating or decide to withdraw at any time. Questionnaires that have been partially answered will not form part of the data analysis.

The research conducted is for academic purposes only. If the research findings prove to be useful to the broader community, the results could possibly be presented in a journal or at a conference proceeding. No mention will be made about the individuals/institutions who have participated in the survey when presenting the findings.

Thank you for your time and participation.

Regards

Tina Seale (Researcher)
tina.seale@uct.ac.za

Michael Pollock (Research Supervisor)
michael.pollock@uct.ac.za

8.8 Questionnaire

UNIVERSITY OF CAPE TOWN

FACULTY OF COMMERCE

Igniting Knowledge and Opportunity

General Demographical Information

Full Name (Optional). * Required for a potential interview request at a later stage of the research process *

Email Address (Optional)

Name of your university. * This is required for analysis purposes only. Pseudonyms will be used in the thesis *

What is your current job function/title at your university?

Which department are you from?

How long have your been in this role?

Please state your experience in ITRM or Enterprise Risk Management (ERM)

Survey Completion

0% 100%

Next

Information Technology Risk Management (ITRM)

ITRM focuses on the identification and management of risks within the IT domain and mitigates the risks.

To your knowledge, which ITRM framework has been adopted by your university?

- ○ COBIT
- ○ ITIL
- ○ ISO 1799
- ○ NIST
- ○ HEISC
- ○ MoR
- ○ Custom built framework
- ○ Not sure
- ○ No framework
- ○ Other

Is there a formal process at your institution to select a suitable ITRM framework?

- ○ Yes
- ○ No
- ○ Unsure

Were you a part of the decision making process to select the above framework?
If *Yes*, what was your role?

- ○ Yes
- ○ No

How long did this process take to decide on which ITRM framework was suitable for your institution?

Which committee (s) are a part of the ratification of the selected ITRM framework?

Who are the key staff members involved in making the decision to adopt an ITRM framework for your institution? Job functions or Job titles may be provided here to provide anonymity

What is the main reason(s) for selecting the ITRM framework at your institution?

In your opinion, what are the perceived benefits of the selected ITRM framework?

In your opinion, what are the perceived challenges of the selected ITRM framework?

In your opinion what are the most important factors which influence the decision to adopt an ITRM framework? Rank them in order of the "Most Important' to the "Least Important" by dragging and dropping your choices.

- Adequacy of Risk Governance Structures
- Attitude of decision makers towards IT Risk Management
- Compatible with other standards and frameworks.
- Costs to implement the framework
- Financial Compliance
- Higher education industry characteristics/Culture
- Integrated Risk Management strategy aligned with Business Strategy
- Internationally accepted good practice
- Legal/Statutory Compliance
- Popularity of the framework
- Pre-existing Knowledge of the framework
- Presence of a Big Four auditing firm
- Presence of a Chief Risk Officer
- Quality of organisation culture
- Regulatory Compliance
- Resource availability to implement framework
- Size of the organisation
- Strong Corporate Governance
- Strong Leadership
- Support from Board
- The ITRM framework can be adapted for higher education
- Other (please add text)

If you are instrumental in the selection of the ITRM framework at your institution, would you be willing to be interviewed for a short semi-structured interview for additional information about the decision making process

- Yes
- No
- Uncertain at this stage

Copy of Research Thesis

Please indicate if you would like a copy of the research findings? This will be distributed after the research has been completed and examined.

- Yes
- No

Additional Feedback

Please feel free to share any additional comments regarding this research.

Survey Completion

0% 100%

Back Next

Thank you for taking the time to fill out the questionnaire.
Your input is greatly appreciated for this research undertaking.

Survey Completion

0% 100%

8.9 Cover Letter - Interviews

Department of Information Systems
Leslie Commerce Building
Engineering Mall, Upper Campus
OR
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21650 2280
Internet: http://www.commerce.uct.ac.za/informationsystems/

Request to conduct research and interview participation consent form

Dear …….

The research study entitled ***"Factors influencing the decision to adopt an Information Technology Risk Management framework at universities in South Africa"*** objective is to *determine all factors which have an influence on the decision to adopt a specific ITRM framework at universities in South Africa.*

The last phase of this data collection process requires ***semi-structured one-on-one interviews*** with key staff who are responsible for selecting an IT Risk Management framework at your institution. This is required to obtain additional in-depth data from your institution. The interview will be conducted at your preferred venue, alternatively a skype meeting would suffice if it is more suitable for you, and will last approximately 20 - 30 minutes.

If you are willing to participate in this study, kindly sign the attached form and return to me at a suitable time, alternatively you may reply to my email confirming your participation. I will therefore arrange a meeting at a suitable time with you.

Should you have any questions regarding this research, please feel free to contact me telephonically on **073 289 8644** or email: **chrtin004@myuct.ac.za**

Your participation in this study would be greatly appreciated, but is entirely voluntary.

Sincerely,

Tina Seale

Researcher & MCom Student
Department of Information Systems
University of Cape Town
Email: chrtin004@myuct.ac.za

Supervisor: Michael Pollock

Research Supervisor
Department of Information Systems
University of Cape Town
Email: Michael.pollock@uct.ac.za

Research Participant Consent Form

I, _____, consent to participate in the research on ***Factors influencing the decision to adopt an Information Technology Risk Management framework at universities in South Africa***.

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time, should I choose to do so.

_____ _____

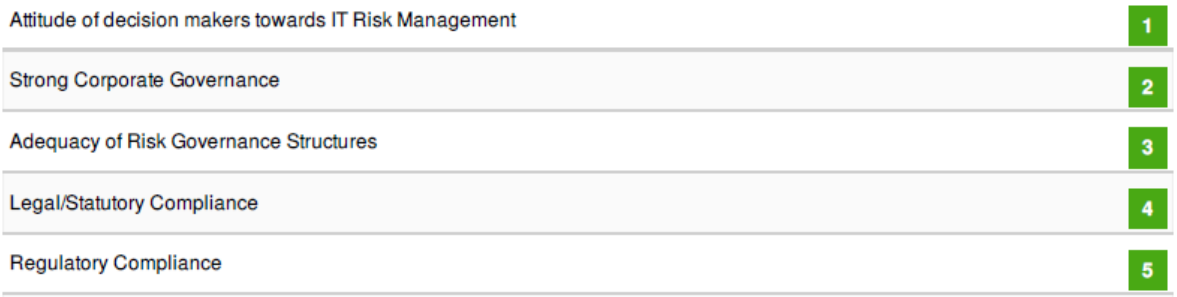
Signature Date

8.10 Semi-Structured Interview Questions – Interviewee A

1. Based on your feedback in the questionnaire, you mentioned there were parts of COBIT and ITIL were selected for your university. **What is the reason that COBIT/ITIL was selected instead of a different framework?**

2. Your response to the question asking about your perceived challenges for selecting the COBIT/ITIL ITRM framework was that it is generally perceived as an "*added overhead rather than adding value…*" **Please can you elaborate on that to ensure its understood fully?**

3. The top 5 factors influencing the decision to adopt and ITRM framework which you selected were:



What was your justification for selecting these?

4. Has the COBIT/ITIL framework been implemented yet at your institution?

   a. If yes:

      i. How far have you progressed thus far with the implementation?

      ii. Was the implementation a success at your institution? (*Give examples to interviewee*: risk register updated timeously, reporting mechanisms)

      iii. How do you measure the success of the implementation?

      iv. What were the challenges you encountered with the implementation? (*Give examples to interviewee*: time, resources, policy, approval)

   b. If not:

      i. Do you know when it will be implemented?

      ii. Are there any particular challenges preventing the implementation of the framework?

8.11 Semi-Structured Interview Questions – Interviewee B

1. Based on your feedback in the questionnaire, you mentioned there were parts of COBIT and NIST were selected for your university. **What is the reason that COBIT/NIST was selected instead of a different framework?**

2. Has the COBIT/NIST framework been implemented yet at your institution?

   a. If yes:

      i. How far have you progressed thus far with the implementation?

      ii. Was the implementation a success at your institution? (*Give examples to interviewee*: risk register updated timeously, reporting mechanisms)

      iii. How do you measure the success of the implementation?

      iv. What were the challenges you encountered with the implementation? (*Give examples to interviewee*: time, resources, policy, approval)

   b. If not:

      i. Do you know when it will be implemented?

      ii. Are there any particular challenges preventing the implementation of the framework?

3. With reference to your response about the perceived benefits for selecting this framework, you said you knew far too little to make an informed statement. Do you have your own notion of what the benefits could be for adopting this framework, based on your experiences?

4. The top 5 factors influencing the decision to adopt and ITRM framework which you selected were:

Legal/Statutory Compliance	1
The ITRM framework can be adapted for higher education	2
Strong Corporate Governance	3
Compatible with other standards and frameworks.	4
Integrated Risk Management strategy aligned with Business Strategy	5

What was your justification for selecting these?

8.12 Semi-Structured Interview Questions – Interviewee C

Interview Questions – Interviewee C

1. In Question 17 you mentioned that the "*Management Committee IT Governance Committee"* are part of the ratification to select the framework at your institution

    a. Are these two separate committees*? (clarifying response in questionnaire)*

    b. Is Management Committee – Is this the IT Management committee or the senior leadership group of your institution?

2. Based on your feedback in the questionnaire, you mentioned that COBIT was adopted at your university. **What is the reason(s) that COBIT was selected instead of a different framework?**

3. Has the COBIT framework been implemented yet at your institution?

    a. If yes:

        i. How far have you progressed thus far with the implementation?

        ii. Was the implementation a success at your institution? (*Give examples to interviewee*: risk register updated timeously, reporting mechanisms)

        iii. How do you measure the success of the implementation?

        iv. What were the challenges you encountered with the implementation? (*Give examples to interviewee*: time, resources, policy, approval)

    b. If not:

        i. Do you know when it will be implemented?

        ii. Are there any particular challenges preventing the implementation of the framework?

4. The top 5 factors influencing the decision to adopt and ITRM framework which you selected were:

Support from Board	1
Strong Corporate Governance	2
Strong Leadership	3
Attitude of decision makers towards IT Risk Management	4
Quality of organisation culture	5

What was your justification for selecting these?

8.13 Interview Consent Forms – Interviewee A

Research Participant Consent Form

I, [redacted], consent to participate in the research on ***Factors influencing the decision to adopt an Information Technology Risk Management framework at universities in South Africa***.

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time, should I choose to do so.

[redacted] ___01 August 2016____

Signature Date

8.14 Interview Consent Forms – Interviewee B

Research Participant Consent Form

I, [redacted], consent to participate in the research on ***Factors influencing the decision to adopt an Information Technology Risk Management framework at universities in South Africa***.

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time, should I choose to do so.

[redacted]

Signature

05-08-2016

Date

8.15 Interview Consent Forms – Interviewee C

There was no signed form but an appointment was scheduled with interviewee after confirming the interview request telephonically.